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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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THE EXPERIENCES OF AN ARMY OFFICER.

[*Extracts from the Diary of General Harvey E. Brown. Born September 6th, 1795. Died March 31st, 1874.*]

I WAS commissioned in July, 1818, a Second Lieutenant of Light Artillery, and stationed in Boston, the Headquarters of this fine regiment. Here I was in a good school for discipline, and as fine a one as I have ever since seen. Almost the first duty I performed at Fort Independence called into practice my youthful decision and firmness. The Post was the General Depot of Prisoners who were collected here previously to being sent to New Orleans to work as convicts on the forts. One day, when Officer of the Guard, the prisoners, some one hundred in number, got liquor and raised a perfect riot and mutiny in the prison room. They were headed by a notorious convict, who had been in the pillory and one noted for his recklessness. I went in the prison to quell the tumult, and having punished this fellow, and one or two others of the ring leaders, partially quelled it, but shortly after it was renewed with an evident intention to get me again in, and then to assault me; accordingly I reëntered with my sword in my hand, and one or two of the guard with me, and the moment I was in and the door shut, this fellow suddenly sprang upon me (I must observe that he and some others had an iron collar round his neck with two projecting arms); he forced me with great violence in the midst

of the others and against the wall. I seized the prong of the collar as I was carried backward, and with a strong arm wrenched it down and fortunately the other prong caught under his arm, so that I nearly broke his neck. Finding himself in this uncomfortable position, he most humbly and abjectly begged for mercy, promising if I would let him go, he would behave himself. I did so, when, watching his opportunity, he again attacked me, but with the assistance of the guard I again partially repelled him and getting sufficiently off to use my sword, on his rushing on me a third time I quickly seized my sword (a heavy sabre) by the blade and as he advanced struck him over the head, and laid him lifeless at my feet, and the mutiny ceased at once. The fellow was carried to the Hospital, and his skull was found to be fractured;—he was a long time suffering but finally recovered, to make another more serious attempt on my life. As this was my *coup d'essai* in service I felt a little uneasy as to the reception I should receive from the Commanding Officer, but on my reporting the facts to him the only censure I received was for not using the edge instead of the hilt of my sword. I never afterwards had a mutiny among the prisoners; they were satisfied with the energy and decision of the young officer.

Some few months afterwards I was ordered to go with them (these same prisoners), then numbering 200 or 250 to New Orleans. Our command consisted of three officers, of which I was the youngest, and of thirty raw recruits as a guard. We sailed along prosperously and without any incident worthy of notice until when off the coast of Cuba one of the prisoners at night desired to speak to the officer on guard (myself, I think); on his coming he reported that the prisoners had conspired at day-break to take the ship, and to carry her to Barataria, then a noted place for pirates, after having murdered all the officers; that the mutiny had been long in contemplation, and that about thirty (whom he named) were engaged in it; that he reported it to save the life of Lieut. Drane, who had been kind to him. We were in the habit of taking some thirty or forty of the prisoners on the deck at a time, as the weather was sultry, and the mutineers had planned to get on deck at reveillé by answering to the names that might be called, and then by a sudden rush

on the guard, disable them, seize their muskets and thus armed rush into the cabin and murder the officers. The head of the conspiracy was, I think, the same notorious rogue who had assaulted me at Fort Independence, and who suffered so severely for it. We took immediate measures to secure these gentlemen and found on examination that they were nearly, or quite all, old sailors, and that the story of their intended mutiny was true was placed beyond a doubt for, on examining their irons we found that in every instance the iron rivets had been removed and lead ones covered with rust substituted, so that they could in a moment free themselves.

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In 1825, on the 11th November, I was commanding the Post (St. Augustine, Fla.), and went with a brother officer, Lieut. Canfield, outside the bar in the Post barge to visit the Captain of a Revenue Cutter. We had a fine boat, rowed by six men, and in going out crossed in safety, but whilst there the wind arose and blew a stiff breeze, making quite a sea on the bar, which is a very rough and dangerous one. Before leaving the cutter to return I expressed to the Captain my apprehensions of danger in crossing and suggested whether I had not better put the boat's head to the sea and back in through the breakers, but both he and a pilot on board assured me there was not the least danger, that if I put the fore sail on her she would carry us in in perfect safety. I accordingly gave up my judgment to theirs, and did as was suggested, but before leaving requested the Captain to have a watch kept on us, and if anything should occur to come to our assistance; this he promised, and we started. To use every possible precaution, I unshipped the rudder and, to have more complete control over the boat, took an oar and steered with a man to assist me, Lieut. Canfield holding the sheet in his hand (it is well known that in breakers three heavy seas usually succeed each other). We sailed swiftly along until we reached the breakers, when a tremendous heavy breaker came with its white top combing over upon us. It lifted us up mountain high, and passing by left us, in spite of our exertions, broadside to; and before we could get the boat around and any headway on her, another great wave came, burst all over our heads, rolling the boat over and over and throwing us far away

into the breakers. We were all good swimmers, with one exception. The poor fellow sunk to rise no more and the rest of us regained the bottom of the boat, when we got into which, our heads were just out of the water. Every wave that came dashed us off when the boat would rise to the surface, sometimes right side, and sometimes bottom up. The tide was ebb, and we, drifting to sea. The constant labor was so exhausting that in the course of an hour or so, three more of my poor fellows found a watery grave. About this time I observed that the cutter had hoisted her sails and was standing towards us, and I supposed that they had discovered our accident and were coming to our assistance. Judge then of our heart-sinking when we saw her tear away and sail out of sight. I had had the fever and ague for some time, and being in consequence weak, considered my chance of safety very small; but being a good swimmer and aware of my weakness I husbanded my strength as much as possible and to this and the blessing of Almighty God owed my preservation, as all those who perished, except one, had a much better chance of safety than I, being all strong, athletic young men and good swimmers. After all were drowned but four, the boat was much lighter and we could sit in her, one of us taking the bow, one the stern, one the midships, and the other the sails, which being attached by the sheet to the boat floated with us. As we drifted near a point of land this man asked my permission to try to swim ashore. I told him no man could contend against such a tide, and that if he attempted it he would perish. Just at this time a heavy sea struck us and knocked us far apart. I was so deeply submerged that I thought I never should again reach the surface. When I did so and had swam to the boat poor Muagi had gone. I soon discovered him at a distance swimming towards land. I watched him as well as I could until being again submerged. When I arose and reached the boat he was nowhere to be seen,—poor fellow, he was lost. Some time after this the tide began to flow and we were again carried through the thickest of the breakers, we became very cold and chilled. About sunset we got so far within the breakers that, while the sea broke over our heads, it did not throw us from or upset the boat; this is my last recollection. I became insensible and knew nothing more until I

found myself at the Light house surrounded by friends, and a Surgeon trying to resuscitate me. After I had sunk into insensibility it appears that we floated slowly along until about ten o'clock when the boat reached the shore. Canfield and the surviving soldier sprang out, and he cried "Brown, we are saved!" but receiving no answer they came to me and found me lying lifeless in the boat; they endeavored to get me out and succeeded so far as to get me on the beach, but through exhaustion they could do no more, and left me to go to the Lighthouse and to send assistance. During this time people from town had come down and were patrolling the beach, and I was found by one of them with my head on the sand and my body floating up and down—in a few minutes the rising tide would have floated me off. I was naked except my pants, having early thrown off my coat and jacket, and Canfield says that after sunset I took off my shirt, and that on my throwing it away he got it and put it on me. I was carried to the Lighthouse and by the kindness of friends and the skill of the surgeon, was restored to life, having been about six or seven hours in the water.

The next morning I was carried to town, and found myself a perfect Lazarus, covered with sores from head to foot caused by the knocking off the skin by being dashed against the boat. I think I had upwards of forty such wounds. A circumstance very remarkable, indeed almost miraculous is, that an anchor in the boat accidentally, indeed providentially, became so jammed in the bar that it never was moved. Notwithstanding the constant rolling over and over of the boat, had it got loose we must all have perished as the boat would have remained in the heaviest breakers, and we must finally have become exhausted. Our situation was known in town (St. Augustine) and pilot and other boats came down to our assistance. They plainly saw us struggling in the waves, but the breakers were so rough they did not dare to venture out. My second in command showed a wonderful degree of inertness, and assistance was sent down—not through his, but the exertions of Judge Smith of the Superior Court (Supreme) and other citizens. I don't know, but it seems to me that I could not at that time of my life have seen my brother officers struggling against death without hazarding something to save them. I cannot now sufficiently express my

deep gratitude to my Heavenly Father for my wonderful preservation,—when death, I shudder to think, would have been an eternal one as I was then. Oh! how unfit to die. May I ever now evince it by a life devoted to duty and to Him. Five out of eight perished.

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In 1832 through the machinations of the celebrated Indian Chief Black-Hawk the Sacs and Fox tribes of Indians became hostile to the whites and troops were ordered into their country to suppress them. Genl. Scott had the chief command. A large proportion of the 4th Artillery was ordered on this duty and without hardly a day's notice I was directed to proceed to Fort Columbus, assume command of Company H, and proceed with it to the Mississippi River, (Black Rock) near the Lakes and Chicago. These companies of our regiment were placed under the command of Major M. M. Payne, a good and efficient officer. Leaving my wife and our little ones in our humble little cottager I proceeded with our command up the North River and the Erie Canal. At this time, although no case of cholera had been in the States, yet, as it had reached Canada, great apprehensions prevailed. We were at almost every town subject to quarantine inspection, but not one individual of us had ever seen a case of cholera. We arrived at Buffalo and embarked from there on the 3rd of July on board the steamer *Henry Clay*, our command consisting of, I think, four companies of the 4th Artillery and some two hundred recruits and about ten or fifteen young gentlemen just graduated at West Point, who were going to flash their maiden swords against the Indians. We proceeded without incident until we had left Erie, on the 4th July, and then in the evening, while the young officers were gaily celebrating the day, and the elder ones sitting or lounging listlessly round, a man came and reported that one of the men on deck was ill and very strangely attacked (let it be remembered that not one of our command had ever seen the Asiatic Cholera, or been where it prevailed). We went on deck, and there found him to be very sick with a strange expression on his eyes and features to which we were afterwards but too familiar. The doctor pronounced it cholera. The man died before we reached Detroit, as did another. Arriving there we were visited by the

health Officers, and the opinion of our Surgeon confirmed. An additional Surgeon, Everett, was ordered on board. Poor fellow, he was so alarmed that previously to coming he made his will. We landed some citizen passengers who were on the boat (several of whom as I afterwards learned died and they spread the disease far and near throughout Michigan) and were ordered to proceed up the river three or four miles to Hay Island and there to await further orders. By this time several more cases occurred. That evening Genl. Scott passed us on his way to Chicago, hailed and ordered us to follow him to that post. We did so, but before we reached Fort Gratiot at the mouth of the river and on the borders of Lake Michigan, our decks were literally crowded with the dead and the dying, and so many of the crew were either sick or dead that the vessel could not proceed and we had from necessity to land. We did so and encamped on a point of land about a mile from the fort, and immediately put all hands capable of working to erecting tents and huts for the sick. Before we had finished a heavy rain came on which made the disease much more virulent. The young graduates were permitted to leave and the recruits almost to a man deserted. We procured a large barn for a hospital, which was soon filled. Doctor Everett was taken sick and died and Lieut. Clay, a gallant young officer, also fell a victim, and our poor soldiers died off by the dozen. In one or more instances I was awakened before reveillé to bury men who were well at tattoo roll call, so rapid was the progress of the disease.

We had a young surgeon, Kar, full of talent and zeal, who devoted himself night and day to the sick, and it is wonderful how he endured even the want of sleep and physical exhaustion to which he was so long exposed. A young lieutenant named Lenisen also is worthy of being remembered; he volunteered as steward of the hospital, and continued assiduously to nurse and attend the sick and dying during the whole time, and he never had the disease.

To give some faint idea of the awfulness of the disease and of the panic that seized a portion of our command I will relate a circumstance that occurred to me. I was directed to send two men as nurses to the hospital. I gave the neces-

sary orders to have the men detailed, which being done they came to me and begged that I would not send them to the hospital, as it would be their death. I told them I was very sorry but that it was necessary that the sick should be nursed, that they were the first on the roster for duty and that they must go; they showed great reluctance, and finally so far refused to go that I had to take my sword and actually drive them to the hospital. That same night both deserted. The next day they returned with horror expressed in their features and begged I would pardon them, stating that they would a thousand times rather go to the hospital than witness the horrid scenes of the road they passed over. They said the road was literally strewn with the dead and dying men who had deserted to escape the disease and that they saw hogs eating not only dead bodies, but in one or two instances those that had life yet left in them. A few days after our landing, the troops evacuated the fort, and we moved in. Several of our officers were sick and two or three, to their shame be it said, so frightened as to report sick and to remain in their quarters during the whole time of the raging of the disease. This made duty come very hard on the others, particularly as all were more or less under the influence of the disease and weakened in strength, but kept up by excitement and a sense of duty. I have seen six or eight dead bodies lying at one time at the hospital waiting for burial. A singular fact in connection with the disease is, that every baker and every man working in the bake-house had the disease, and several of them died. Col. Twigg and Major Payne (first and second in command) both had the disease, but both recovered. The disease lasted two or three weeks, during which time we lost by death and desertion two-thirds of our command. I lost one-third of my company by death. I was, in addition to my duties as Commander of a Company, Quartermaster and Asst. Com. of Subsistence and was so busy from morning till night that I had no time to think about getting sick, but I had as all had the premonitory symptoms, constant diarrhoea and pains in the joints. I resorted freely to the bath and have no doubt but that it was beneficial.

* * * Our numbers were so far reduced that proceeding further was out of the question, so to our great regret the ex-

pedition was broken up and we were ordered to remain where we were. I stayed at the fort until fall, when I was ordered to Fort Columbus and returned home. I have since seen death in almost every form but never so terrible as then. I was mercifully preserved when so many were cut down. God listened to the prayers so unceasingly raised for me from my loved wife and graciously restored me to her and my little ones. Truly precious and efficacious are the prayers of the pure and good.

In 1835 the Creek Indians in Alabama and Georgia unburied the hatchet and commenced hostilities against us; headed principally by Ne-a-matt-la, a Seminole, an old Florida acquaintance of mine. He was very talented and very hostile. Three days after hearing it, I was on board ship with my company and bound to Charleston, to the seat of war, and it is worthy of record that, although we had a long voyage, and vessels that left New York several days after arrived several days before us, yet I actually sailed this distance without any other accident than that of falling down the main hatchway and nearly breaking my neck; hurting myself so much that I had to stop in the subsequent march, being unable for two or three days to proceed. We went from Charleston to Augusta, and from thence to Columbus, and from there into the Indian country in Alabama. The command of the Army was at first divided between Scott and Jessup, but Scott being recalled through the machinations of his enemies Jessup remained to prosecute the war. I was under the command of both these generals during the campaign, but principally served under Jessup; the war was a desultory and tedious one—the Indians never offering battle but keeping up a running and defensive warfare. In traversing their country we would meet many and striking evidences of the barbarity of their warfare in ruined and devastated plantations and burned mansions. I was a considerable portion of the time commanding a post in the interior and saw a good deal of the Indian character—a tribe being near me who had come in and were friendly. I was also employed to visit the military stations in the extreme South, and travelled through the whole Indian country a part of the time with only my orderly. In our military expeditions we were constantly deluded by false reports and very frequently called up in the night by false alarms. On one

of these occasions, in Georgia, in the middle of the night, a sudden alarm that we were beset on every side, caused us to rush to our posts and our commander had not time to dress, but *sans-culotte*, he mounted his horse and it was truly laughable to see him riding furiously about, his shirt flying like a pennant to the breeze. We ended this war without any actual fighting, except mere skirmishes, by the capture of Ne-a-matt-la, when the others came in and made peace. Just at this time, when indulging the fond hope of a speedy return home, the Seminole Indians in Florida (a runaway tribe of the Creeks), became hostile and took up the hatchet, and we were ordered into that territory to subdue them. The Government, having the difficulty of white men finding and capturing the Indians in their wild fastnesses, concluded to try conquering them by their own people. Accordingly a regiment of Creek warriors was raised (our late enemies) of about one thousand men, the field officers of the Army and the subalterns from the Indian Chiefs and Sub Chiefs. They were headed by four or five principal Chiefs, heads of tribes who were subordinate to, and under the command of the colonel of the regiment. We started from Fort Mitchel and went to Apalachicola and there organized the regiment. It was organized into ten full companies of Indians and to it were attached two companies of Artillery—my own, and that of Capt. Morris, who was appointed Major of the regiment. I was the Lieut. Col. and second in command. Having made our arrangements and completed our organization we sailed from Tampa Bay, and after scouring the woods in its neighbourhood, we commenced our march to Fort Drane, the Headquarters of Governor Lake, the Commanding General. Our march was through the most hostile portion of the country of the enemy. We saw constant signs of his presence but nothing more until we reached the neighbourhood of Wahoo Swamp, the stronghold of the enemy. Here we discovered a party and suspended our march to pursue him, which lasted for several hours through swamps and hummocks, sometimes for nearly a mile up to our necks in water, and in one instance I think nearly two. We had of course to abandon our horses and our men had to put their ammunition on the ends of their rifles and thus keep them out of the water.

We destroyed one or two towns and had a sharp skirmish

with the enemy who made a stand on the edge of a thick hummock. We however finally drove him from his position and pursued him to the With-la-coo-chie where, crossing over by morning, he escaped us. The result of this day's fight (the conduct of the Indians in it) did not impress me very highly with the courage, skill or efficiency of our regiment and I had striking evidence that in Indian battles there is very much more bluster and noise than real fighting. We returned late to our camp and the next morning resumed our march. Having early reached the With-la-coo-chie we were the remainder of the day employed in getting our baggage over, having no boats and only the rafts made by ourselves, and the river was deep and rapid, though not very broad. Being the second in command, the superintendence of the crossing devolved on me. It was a tedious occupation and hazardous movement thus to cross a broad river in the very heart of the enemy. I was the last one of course to cross and did not reach our bivouac till late at night. I found the regiment encamped in the old fort where Genl. Gaines had been so long beleaguered by the enemy, who entirely surrounded him, and cut off his communication with the other posts, and all his supplies, and the Indians would have probably massacred him and all his command if he had not been happily relieved by Genl. Clinch, who fortunately heard of his perilous situation and by forced marches reached his camp and relieved him. We were equally remote from friends, much fewer in numbers, and surrounded by the same enemy, though not immediately so. I was eating my supper after my day's fast when the Colonel commanding came to me and told me he had something of the most urgent importance to communicate which required all our discretion and energy. He said he had discovered that two or three of the Head Chiefs, especially one John O'Poney, were traitors, and had formed a plot to join the enemy, delivering all the whites over to their tender mercy. As may be supposed I was startled at such information coming from the Commanding Officer surrounded as we were by the whole body of the enemy in the very heart of his country, far away from succor. * * *

I was also much surprised at the names of the chiefs said to be concerned as I had considered them as among our most faith-

ful allies. Nevertheless I did not for one moment doubt, as he assured me, he had by the means of spies in his employ obtained the most positive evidence of the fact. We agreed to confine the news to our own breasts and to take every possible precautionary measure. I accordingly took immediate command of the two companies of artillery attached to the regiment and had them so detached from the Indians as to be ready to repel any sudden assault. The Colonel, by a promise of a large reward induced a runner (an Indian Negro) to take a letter to Genl. Call, informing him of our situation. We were on the alert all night, but it passed without incident. The next morning we marched very early taking with us some sixteen or seventeen hundred head of cattle that we had captured the day before. We marched in three parallel columns with an advanced guard and flankers so that we could not be well surprised or fall into an ambush. Our day's march passed without incident or a sight of the enemy. We encamped as usual and had our cattle penned when, to my astonishment, I found our Colonel to be in a very excited state and giving evidence of more alarm than on the preceding night. I saw no immediate cause of alarm and could not comprehend it. He suffered our cattle (that we had thus far preserved with so much trouble and which were of so much importance to us) to escape and would not permit them to be sent for or collected again. Indeed he was so evidently alarmed and excited that I persuaded him to take some rest, telling him that I would take command of the guards and watch all night. I accordingly did so, and having doubled all my guards and taken every precaution we were quiet, when late at night a detachment of horse sent by Genl. Call to our relief arrived. All fears and apprehensions were of course at once banished and all was joy. The conduct of our Colonel, a gallant officer, was to me perfectly inexplicable, surrounded as he said by danger in its worst form, by treason within and a savage enemy without. All the prudence, decision and energy possible were necessary to meet the emergency, but he from alarm and excitement was incapable of giving orders or taking any precautionary measures, and when our friends arrived he changed from one extreme to the other. His delight was as great as before had been his depression; all this was to me a riddle.

The next morning we continued our march and on the second morning the Colonel left us to ride forward to head quarters, then a few miles in advance. The sun had been intensely hot during our march and we had suffered much from heat. About 9 or 10 o'clock I reached Fort Drane with the regiment and reported immediately my arrival to the Commanding General. I found Col. Lane with him. The latter desired me to go with him and he would show me the ground assigned for our camp. We went accordingly. I found the mind of the Colonel to be very confused, and his directions so much so that I could not understand them. I however laid out the camp and then went with the Colonel to see Capt. Galt. He left us in a few moments and went to his own tent, which was near. In a few minutes we heard groans, and running to his tent found him just expiring, having pierced his brain with the point of the sword by putting the hilt on the ground and then striking his head down on the point, which entered the eye and penetrated the brain. The whole mystery of the past few days was at once revealed; he was evidently deranged, probably caused by brain fever, induced by anxiety, the responsibility of his situation and long, continuous marches under a burning sun. By his death the nominal command was given to another, but the actual command during the remainder of the war devolved on me. We remained at Fort Drane a few days when the army marched South in pursuit of the enemy. Passing the *With-la-coo-chie* we again struck the trail of the Indians, crossed the river and had a slight skirmish, and the day after striking another trail we pursued it to the river, but saw no signs of the enemy. I have run a great risk, my life being entirely in the power of the enemy except that it was protected by a kind Providence. Having found a canoe at a sharp turn of the river I got into it and paddled to the middle of the stream to enable me to have a more extended view, and to see if I could discover the enemy. I was within twenty yards of the opposite bank, and not seeing anything I returned, when orders were given to retrace our steps, but first to destroy the canoe. The first stroke had hardly been struck when a volley from the opposite bank was fired at us, which was speedily returned without much damage on either side. It ap-

peared that the enemy flying before us had crossed the river and placed in ambush in the high grass bordering its opposite banks, intending to attack our divided forces as we were crossing. I was for several minutes within fifteen or twenty yards of them, and owed my safety to the expectation they were under that we intended to cross, as they did not wish their position to be discovered. When we cut up the boat they at once saw we intended to return and hence fired their volley. The next morning, November 21st, 1836, we understood the enemy to be in force on the edge of the Wahoo Swamp. Before marching out to meet him our little army was divided into three parts and marched in order of battle, my regiment of Indians being on the extreme left of the line. We passed several of our horses that had strayed and been killed the night before by the hostiles. Having marched about three miles we found the enemy strongly posted on the edge of a thick hummock the approach to which was open pine barren. Finding myself to be too far to the left to participate in the action I moved nearer to the left to see if I could not turn his right, and take him in rear. I found the right of the enemy to be resting in deep grass ponds some hundreds of yards wide. Marching along these some distance to his rear I then tried to cross, but my horse sinking in the mud I had to leave him and start again, the water was nearly up to our necks. I led my Indians so that we were nearly over when unfortunately separated from my interpreter some one in Indian cried out from the rear for all to come back. The main body turned round and did so, and finding myself with but a few (men) and unable to make myself understood I had to do the same. Had not this *contretemps* happened we should have caught the enemy between two fires and cut him all to pieces. I was very indignant and assembling the chiefs around me told them I would cut down with my sword anyone that dared again to turn back without my orders. We again attempted our march and I ordered them to go on before me, this they were very reluctant to do. In great anger I drew my sword and spurring my horse drove them to the ford. It was truly ludicrous to see me sword in hand chasing a parcel of wild Indians in their wilds and swamps and compelling them to go to battle. I however succeeded in getting some 200 over, but we had been so long in doing so

that the enemy had retreated. We took his trail and swiftly followed him through several swamps till we came to another series of grass ponds; the trail leading across a lagoon between two of these. We were in the act of crossing when the enemy opened fire on us, being strongly entrenched behind some large trees, and Major Moniac and one or two Indians fell dead. We instantly took to the trees and found ourselves in presence of some 600 or 800 of the enemy. Their fire was returned, and a brisk and heavy fire on both sides was continued for several hours accompanied by the war-whoop, when any of ours were seen to fall. (I judged of their numbers by the sound of the whoop.) They did us but little injury as we were ensconced behind trees. The rest of the army had lost the trail, and we were between three and four hours thus fighting against three or four times our own numbers. The difficulty of crossing the lagoon was now our preservation, for the enemy did not dare to attempt it, and he could not without crossing, either outflank us, or take us in the rear. Our troops at last attracted by our fire scattering came up, and the position was held till nearly dark, when we collected our dead and wounded and returned to our camp, arriving there late, and much fatigued. It was supposed that the loss of the enemy was heavy, as one of my Indians who had climbed a tree so as to overlook the field of battle said he saw a great many carried to the rear and their numbers were evidently much diminished judging from the diminished loudness of their war-whoop. The next day we marched forward to renew the battle but the enemy had fled, and the Army marched down to the St. Johns, near Lake George. I was afterwards brevetted for this battle.

THE MILITARY USES OF BACTERIOLOGY.*

BY CAPT. CHAS. E. WOODRUFF, ASST. SURGEON, U. S. ARMY.

THE new science of bacteriology was born but a few years ago, and though still in its early youth, is a giant already. It has accomplished so much that it has already made a decided change in the thoughts and habits of all civilized peoples, and of course in all professions. It certainly behooves everyone to know something about bacteria—indeed it is a part of a liberal education. Its effect upon military customs has been profound, and to the line officer it certainly is essential to know in considerable detail the laws of the science, in order that he may intelligently issue his orders in accordance with changed methods and avoid the frightful preventable sickness which has so often ruined military campaigns from the death or exhaustion of the men. In this paper then we shall make an effort to translate into popular language the technical laws governing the lives of bacteria, and apply them to military uses. This is especially necessary now because quite a large percentage of our infectious diseases are contracted in practice marches and field manoeuvres.

Bacteria are tiny little bits of living matter. Whether they are vegetables or animals does not concern us, but it may be of interest to state that almost all scientists consider them vegetable because they take in their food in solution, whereas all animals, except a few parasites, take in solid food and digest it into fluid form. They are not rooted to the soil like most plants and a few animals, but float freely in the media in which they live. A few scientists consider bacteria animals because they are totally devoid of chlorophyl, the substance which gives the green color to all plants. Chlorophyl is a machine or thermic engine which, when heat and light enter it, is capable of chang-

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ing this kinetic energy into potential energy, by causing water and carbonic acid to unite to form starch, sugar, cellulose and other allied organic chemicals and forcing out the excess of oxygen into the atmosphere. They grow by building up higher chemicals. Animals have no chlorophyl and their life history is the opposite. They eat higher compounds which are broken into simple forms by exidation, producing animal heat, water and carbonic acid. Growing plants deoxidize and exhale oxygen; animals inhale oxygen, oxidize foods and exhale carbonic acid. Plants, while flowering, act like animals and burn up their tissues exhaling carbonic acid. If bacteria are animals, so are mushrooms and all other fungi, which are also devoid of chlorophyl and live on decaying higher compounds. Animals also break up the high compounds of nitrogen, which plants build up from nitrogen or its simple compounds.

Bacteria are found everywhere. There are a few in the air, myriads in dust, and in the upper layers of the soil, which can be considered their natural habitat. They are in all waters, even in brooks, and distilled water. Our bodies are covered with them, they are in the mouth, stomach, intestines and skin.

The first law governing living matter of all kinds, governs the life of bacteria also. They must be kept at a certain temperature varying somewhere between 42° and 140° F., according to the species. Higher animals exist in quite a variety of temperatures, but keep themselves of the proper temperature by oxidation of their food, heat being retained by natural or artificial clothing, and the surplus lost through radiation or evaporation of fluids from the surface of the body. Lower animals, like insects, must be supplied with additional heat, as they either do not produce enough or lose it by radiation by that law that the smaller an object is the greater is its radiating surface in comparison to its bulk and the quicker does it lose all its heat. Plants also must be kept at a warm temperature, for they produce no heat whatever except when flowering, and they utilize heat rays in their chemical processes. Bacteria often produce heat by the chemical changes they cause, yet they will not function unless they are kept warm.

The second law is that they must have food.

The food, with a few exceptions, consists of higher com-

pounds which are broken up into lower ones. Some bacteria will not live on living food, they must have dead food. This food is first liquefied or digested in a way we do not yet understand, and parts of it absorbed and the rest remains as a waste, or is excreted as a waste, after all the food is absorbed. Alcohol is a waste product or excretion of certain low organisms which act like bacteria. Bacteria living on dead food are the *saprophytes* or scavengers. The great majority of all bacteria belong to this class, and all fermentation and putrefaction is caused by these organisms. The next class of bacteria are those which live as parasites in living plants or animals. They were formerly saprophytes but have gradually taken on a parasitic existence so that now they cannot live except on the juices of their host. Cast them out and they die. There are very few species of bacteria belonging to this class of pure parasites.

Many bacteria, such as those causing gonorrhœa, were supposed at one time to be pure parasites, but since we have learned the conditions necessary for their existence, we have been able to keep them alive and rear them on dead food in our laboratories. It is quite probable that all parasites can be cultivated when we know the necessary conditions, so that the list of pure parasites, always diminishing, will eventually disappear.

The last class consists of bacteria which may live either way, sometimes as parasite, sometimes as saprophyte, some thrive best as parasites while others thrive best as saprophytes. To this class belong almost all the pathogenic bacteria, that is, those which cause disease in plants or animals. The typhoid bacillus, for instance, lives as a scavenger, until we swallow it, when it takes on a parasitic existence in our bodies.

The third law is that relating to moisture. Bacteria must have moisture just as every other form of life. No living thing can function if it is dry. This needs no further explanation.

We will now take up the corollaries which legitimately follow from these three laws. First, as to food, we notice that nearly all the decay of organic substances is due to the action of bacteria. Unless bacteria caused the destruction of the bodies of dead plants and animals, the surface of the earth would soon be literally covered with the dead. The carbonic acid would all be locked up in the dead vegetation and all the nitrogen in

dead plants and animals, and all vegetable life would therefore end. Herbivorous animals would then die from lack of food, and then the carnivorous and then the scavengers last, though it is quite likely that changes in the atmosphere would kill off all life long before food was exhausted. Thus the saprophytes are the best friends we have, for without them we would die. None of these pure saprophytes can produce infectious disease, because they promptly die as soon as they enter our bodies. Indeed they may be digested in our stomachs just as other foods are. Some of them produce substances which are deadly poisons, and it is almost a daily occurrence to read in the papers of people who have been poisoned by eating foods that have been kept warm and moist so as to decay, such as milk or sausage, providing of course that the requisite bacteria have been present. If the decay has been caused by bacteria which have not produced poisons, we are not poisoned by eating the substances. Hence partly decayed or "high" game is a luxury greatly appreciated by the epicure. Indeed some savage tribes will not eat meat unless it is very foul from decay. Yet we run a risk, and it is a safe rule never to eat anything in the least decayed, and in accepting rations we have long been guided by this inflexible law.

Bacteria of some varieties require their food very diluted, and if placed in strong solutions as syrups, they die. Some of them require food so diluted that the tiniest quantities of nitrogen in combination, dissolved in the water, will nourish them. Many, if not all germs, are poisoned by the substances they themselves make, just as man can be killed by the urea of his urine. Germs causing alcoholic fermentation are killed as soon as the alcohol they make from sugar, is of a certain percentage. Now let us take up the food of pathogenic bacteria, those causing such diseases as diphtheria, typhoid fever, etc. These bacteria can live in our bodies or out of them, and we cultivate them in the laboratory just as a florist cultivates rare and exotic plants. If they fall into a mass of putrescible material which is moist and warm, they multiply with frightful rapidity, and we must digress a moment to explain their multiplication or reproduction. A bacterium reproduces by simply enlarging and splitting into two daughters, each of which is half of its

mother. The mother can be considered as still living in two pieces, each of which divides into two granddaughters, and so on. This is the law of immortality, living matter never dies—only parts of it die,—and biologists have now applied this law to all living creatures. Other fungi (the moulds) multiply by spores, that is, a tiny very resistant piece is cast off like an egg, and it develops into a likeness of its parent. Still others (blastomycetes) multiply by “budding,” a tiny bud grows out and is cut off and then grows to the adult size.

The reproduction of bacteria takes but a few minutes. Let us say that in fifteen minutes instead of one there will be two, in a half hour four, and so on. It is difficult for one to conceive how rapid such a geometrical proportion is. In three days one bacterium could by its descendants fill all the oceans of the earth, and in five days they would weigh as much as the earth. Now, suppose one single typhoid bacillus is left in a milk can in a drop of water used in rinsing the cans, and the pure milk is subsequently poured in and kept warm enough for that single bacterium to develop and multiply. A moment's thought will show that in a very few hours there will be enough bacteria in that one can of milk to cause a very extensive epidemic. The same may be said of pathogenic germs falling into decaying material anywhere. Such germs are found mostly around our habitations, and we should then try to starve them by the most perfect cleanliness. Hence modern sanitation is founded on the law of the quickest possible removal from the house or its neighborhood, of any organic refuse materials in which bacteria can grow. We take the refuse where it can be harmlessly oxidized. We used to dig deep cesspools where we carefully preserved fæces as long as we could, and they were splendid breeding places for disease. We used to throw all our slops in the streets at our very doors, and kept the streets and alleys as filthy as possible, but now the slogan of reform is absolute cleanliness around our habitations. Attention has been officially called to the fact that if an army post needs constant disinfection, it is proof that it is not properly cared for, and somebody is to be held culpable for not removing the materials into which the infection has been deposited. If the post had been kept clean and free of putrescible material, there would be little to

disinfect. In war this law has been given practical trial long before we knew anything about bacteria, and in the rebellion, observation showed that those regiments under careful men who paid great attention to camp cleanliness, had a minimum of sickness, while near by would be a regiment with a filthy camp and almost incapacitated from disease.

Above we said that refuse must be put where it can be harmlessly oxidized. It is not best to wait for the bacteria to do this because they are too slow. The best method is to burn all refuse, and to this end sanitarians are erecting crematories in all large cities and in large military posts and permanent camps. The next best method is to cover the refuse with a fine soil, or bury it within a few inches of the surface. Here the bacteria accomplish their work in a reasonably short time, harmlessly and without offense, evolved gases being absorbed by the soil. If burial is too deep, we get out of reach of bacteria, which will not live beyond a very few feet, for we know that wooden piles driven deep are preserved indefinitely, and the same occurs with deep burial of refuse. Spring waters coming from great depths are entirely free of bacteria. Superficial burial is the method useful in temporary camps. Pits are dug for kitchen waste and for latrines, and twice daily the police party covers the refuse with a thin layer of the soil which was removed from the pit. The mistake is often made of not doing this at the proper time. The latrine should be attended to about 10 A. M., for by this time most of the men have used it, and it then remains in good condition and fairly odorless. Improperly attended to, a latrine is the foulest thing I know of. Of course, it would be better to have dry earth at hand, so that each man can use it before he leaves the latrine, but soldiers would never do this voluntarily. Recent experience shows that latrines are almost invariably made too small.

It is surprising how quickly bacteria destroy such materials in the soil. Experiments prove that within a week or two a mixture of powdered earth and fæces, if properly made, is so harmless as to be capable of being used over again, and this can be repeated several times before the soil loses its power to absorb the gases produced by the bacteria, so that if plenty of soil is used in a camp, the latrines, instead of becoming a nuisance

when filled, necessitating moving the camp, are not objectionable, neither on the ground of health nor comfort, and after one is filled up another can be used near by, and eventually we may use the old ones over again. If plenty of covering is not used twice a day, the place becomes indescribably foul and disgusting, for all the gases produced by the decay escape into the air instead of being absorbed in the porous covering, and if infectious bacteria are present, the common house-flies get their feet covered with the germs, and coming into our dining rooms deposit the germs on our food. Much disease is known to be thus spread. It is believed that in soil, oxidation goes on more quickly than in the open air. Furthermore, experiments prove that certain pathogenic bacteria will not live long when thus buried, and if they do live they never penetrate more than a few feet. Thus the danger of infection from a graveyard is almost nothing, and even deep spring waters coming from graveyards are harmless, though shallow well water in the same spot is open to serious suspicion.

Even sewage is now being buried by turning it on sewage farms. It filters through the soil, leaving behind its impurities and in well conducted farms it issues fit to drink. The process is used intermittently, so as to give the impurities left behind time to be destroyed, and quick-growing vegetables are planted to use up the nitrogen left by the bacteria. In this method farms can be conducted hundreds of years, indeed, indefinitely. They are devoid of all odors and objections, and the health of the workmen and of their families is better than in the cities whose sewage they take care of. It need not be mentioned, of course, that the chemical substances left by the bacteria enrich the soil by supplying the materials needed by the rootlets of vegetation.

The most objectionable way of destroying refuse or sewage is to throw it into a river, because water bacteria can only take care of a limited quantity, the rest falling to the bottom, permanently fouling the river bed. Again it takes time to destroy even what they can and it is carried long distances before it is burned up, in the meantime supplying food for pathogenic bacteria (typhoid, etc.), which may actually increase in numbers so that the water is unfit to use for many miles. This is the great

public crime in all countries. The water is public property belonging to all the people living in that water-shed, and yet each community considers that it has a right to so befoul its river that others living below cannot use it without boiling and filtering. It is an interstate or national crime which the general government should stop.

Another corollary of the reproduction of bacteria is that there is no such thing as spontaneous generation; each one must spring from a parent. We can be positive then that every case of infectious disease has been infected by a previous case. Every typhoid fever, for instance, is due to a previous case. We cannot emphasize the military importance of this too highly. Whenever any case arises it is the duty of the line officer to try to find out where the infection came from. If we could always destroy the infection certain infectious diseases would become extinct. It is certainly an interesting speculation that perhaps certain species of bacteria which once afflicted man are extinct, like the mammoth, and that prehistoric epidemics will never return.

Whether certain harmless germs can take on parasitic characters in the future is a mooted question. If they can, then new diseases will arise as long as man exists. Nevertheless it is not such a horrible thought as it takes ages of time to accomplish such changes in the habits of bacteria. Every disease now existing has probably afflicted us for many centuries, indeed we have evidence that some have been described at least two thousand years ago.

Those diseases caused by germs which are naturally found in the soil, as tetanus, will never disappear.

Each species of bacterium needs a temperature peculiar to itself, some thriving best at low temperatures, 50° to 60°, such as those harmless ones found in pure mountain streams, while others require higher degrees, and those which produce diseases are best suited, of course, by a temperature about that of the blood. Scientists have worked out these temperatures and give the range in which each species thrives, and beyond which it does not thrive. At a certain point above this range is the thermal death point at which the bacterium is killed by the heat. Some are like brook trout and are killed by a very mod-

erate heat; others at 110° , others at 150° , and some even as high as 300° . A very few are killed by cold. Yellow fever is one of the very few diseases in which the infection is destroyed by cold. The germ causing this fever is killed by a temperature of 50° .

The great majority of bacteria can be frozen for long periods without detriment. Ice, for instance, is now known to be a very dangerous means of carrying such infection as typhoid fever, and if it is cut from a pond of impure water no Board of Health should permit its sale. Some bacteria can even stand such low temperatures as that of solid carbonic acid, or liquid air, though such experiments are as yet so few that we do not know how many are killed by such low temperatures. Some can survive a temperature of 460° degrees below zero, the temperature of external space, and it opens up the interesting possibility of living matter being carried from one world to another clinging to meteorites cast off by explosive violence. The germ of cholera though easily killed by drying, resists cold very well, and one of the most widespread and fatal epidemics is said to have occurred in Russia in midwinter. The serfs had a habit of throwing the bowel discharges of their sick out on the snow, and afterwards collecting snow and melting it for drinking water, thus drinking the frozen but living germs.

The upper thermal death point is far more important. Almost all pathogenic bacteria are promptly killed by a temperature short of boiling water, even 150° if prolonged sufficiently. It is said that no bacterium harmful to man can stand a boiling temperature five minutes. This fact is of vast importance in military life. Bacteria requiring higher degrees to kill them are harmless saprophytes. If we wish to kill them as when we preserve meats, fruits and vegetables in cans, then we must either resort to prolonged boiling supplemented by antiseptics like salt, or use a very high heat, over 300° , as the meat packers do, with steam under pressure. In the field a great deal of disease is produced by infected waters. Whole regiments have been prostrated, indeed campaigns have failed from this cause alone. It can all be prevented by boiling suspicious water. Just bringing the water to the boiling temperature is sufficient, though we generally direct it to be boiled 15 or 20 minutes to be on the safe side. Herein lies the advantage of soldiers drink-

ing weak tea or coffee and being supplied with soups every day. They may thus take in sufficient sterilized water to prevent them drinking anything else. The cooking of our food sterilizes it. Bread, for instance, is sterile, and though the dough may be infected with syphilis and all other germs by filthy bakers as in the slums of cities, yet the bread is harmless. The cooked flesh of animals dying of disease may be perfectly harmless, yet before it is cooked it may give us a fatal infection. Milk is an exception because it is not cooked, hence tuberculous cows are extremely dangerous in spreading infection through the milk. If we always boiled the milk it would be harmless, and in feeding babies with milk of unknown sources we are compelled to sterilize it in some way.

Though a low temperature does not kill bacteria, it prevents them growing, hence cold will preserve organic material indefinitely, even thousands of years, as in the case of the mammoth discovered in Siberia in 1799. This fact is destined to revolutionize methods of supplying fresh foods to troops in the field by cold storage. For instance, frozen beef can be transported in common freight cars, for three days in hot weather, before it warms up sufficiently for the bacteria in it to cause decay. Instead of depending on salt beef, and diseased, underfed cattle carried along with the army, we will be fed from the monster stock yards of Chicago, Omaha and Kansas City. It is not necessary to keep fresh foods frozen to preserve them, a temperature of 40° F. is sufficient, for at that point all the putrefactive bacteria are inactive. In the beef industry it is not usual to freeze the meat, but in long trips, as in ocean steamers, it is customary to get the room temperature decidedly below 30° F. Of course any degree as low as 20° below zero F. can be reached by brine machines, and indeed any temperature we desire by means of liquid carbonic acid.

(NOTE.—In all the published testimony as to the beef supply in our late war I do not remember seeing any statement that solidly frozen beef was sent to the front.)

The necessity for moisture need not detain us long. Organic material kept perfectly dry never decays, and in this way we preserve a great deal of the soldier's food. For the same reason it is positively necessary to keep our habitations dry, for then

the bacteria we carry in with us have no chance to multiply. Drying does not necessarily kill bacteria. A few species are promptly killed by drying them. The cholera bacillus is thus killed in a few hours, and dried merchandise from infected ports is harmless. Likewise the germs of gonorrhœa are promptly killed by drying, and the disease cannot be contracted from dried discharges. Typhoid fever germs are also said to be easily killed by drying, so that there is so little danger of contracting the disease by dust that we can practically ignore dust as a cause. Indeed, typhoid is almost invariably a water-borne disease. Yet the vast majority of bacteria are unharmed by drying, and when deposited in proper food with warmth and moisture, they resume their activities. Disease bacteria may thus survive in a condition of suspended animation for weeks, months and even many years, the extreme limit being positively unknown. The germ of scarlet fever is unknown as yet, but it resists drying several years whether it is bacterium or not. Infected clothing has been known to spread the disease after three years. Bacteria taken from the interior of Egyptian mummies have been said to be alive, but we are justified in doubting the accuracy of this statement. Wheat and corn and other seeds do not survive long, and no farmer likes to plant wheat over a year old; such living matter dies because certain changes do go on in the apparent suspension of life activities and, reasoning from analogy, we assume the same as to bacteria. Eventually, dried bacteria are believed to die. The condition of bacteria under drying, cold and such preservatives as salt, etc., is essentially like hibernation of higher animals. In that state all life processes, respiration, etc., continue, but at a greatly reduced rate, so that the animal lives on its own fat. It comes out of the long sleep greatly emaciated. The lower organisms and bacteria, in a state of suspended animation, are similarly alive, and some kind of changes are going on at a reduced rate, but from which they will eventually starve to death.

An *antiseptic* is that which prevents decay, such as dryness, cold and certain chemicals, as common table salt. A *germicide* is a germ killer, like great heat, and active poisons, like corrosive sublimate, chlorine gas, formaldehyde and carbolic acid. A *disinfectant* is that which kills infection. Sometimes simply

drying acts as a disinfectant, but usually it takes an active germicide to kill infection. For this reason we know that every infection is due to a living germ. Germicides are always antiseptics, because if we kill the germs we surely prevent decay. On the other side antiseptics are not germicides, or at least are very slowly acting germicides, because we are morally certain that, if any agent will keep germs inactive or hibernating long enough, it will eventually kill them. Thus cold and dryness if long continued, say for several years, are quite apt to be germicides. Weak solutions of germicides act as antiseptics, thus a very weak solution of corrosive sublimate is an antiseptic and will prevent decay, but will not kill the germs for a very long time. These terms then have accurately determined meanings which are no longer the property of the scientist, but are common knowledge, and every intelligent man must use them accurately and never use one for the other. For instance, it is very wrong to talk of disinfecting when there is no infection present. If a mass of decaying material does not contain the germs of typhoid, diphtheria, cholera, yellow fever, or other disease, it is a foolish waste to pour out disinfectants on the material. We are trying to kill what is not there, and the disinfectants will prevent that decay which we desire to promote. It would be just as foolish as to fire all our ammunition into a vacant field, the enemy being miles away. We must reserve our disinfectants until infection comes, and we must remove putrescible material so that disease germs will not have food when they do come.

The word *sterilize* is now so often used as to have become common property, and should be used accurately. An article is sterilized when all living matter on or in it, is killed. Hence if an infected article is sterilized it is surely disinfected, for the disease germs are killed along with all other living plants and animals on that article. It is really not necessary to go to the extreme of sterilizing an infected article to disinfect it, because the infective material is usually destroyed easily, and long before other harmless and more hardy bacteria are. For instance, suppose meat is infected by tubercle bacilli. If we boil the meat a half hour or so, it is disinfected and cannot give us tuberculosis, but it is far from sterile, for the hardy putrefactive

bacteria are present, and if the meat is canned and sealed it will decay. The meat packer has to sterilize canned meat, which he does by submitting the can to a very high heat, say of steam at 250° or 300° . At this temperature all life perishes, the meat is sterile, if the can is sealed before other bacteria enter, the meat will keep fresh forever. Bacteriologists use the above terms accurately, but physicians and surgeons have got into a habit of referring to disinfected articles as sterilized, when they may be far from sterile. They may contain all sorts of live, harmless bacteria, but no harmful ones. Thus boiled surgical instruments, boiled water, etc., are disinfected and harmless, and though far from sterile are said to be sterilized. It was once thought that boiling surely sterilized water, beef tea, etc., and the mistake led to an assumption that spontaneous generation of life took place in such materials. The best disinfectant is of course heat. Those bacteria harmful to us are generally killed if kept at 140° F. a few hours, 160° a few minutes and at 212° a few seconds, none can survive boiling five minutes. Hence all our cooked food is positively harmless, unless the bacteria have previously decomposed it and formed chemical poisons, as sometimes happens, in meats, milk, cheese, sausage, etc. Clothing is disinfected in a laundry by the hot water and by the process of ironing, and the danger of getting disease from a public laundry is almost nothing. Hotel dishes, knives and forks are sterilized by scalding and we rarely contract disease from them.

Before heat was used as a disinfectant, we formerly depended on poisons such as carbolic acid. We now know these are not always reliable and we never use them except where heat is not applicable.

One of the best disinfectants we have is sunlight. Many bacteria require subdued light or darkness, and it is believed that but few will thrive in strong light. Indeed it is known that some disease germs are quickly killed if exposed to the direct rays of the sun. Typhoid germs for instance are thus killed in from one to three hours, and therefore do not survive long if introduced into clear rivers and the sun shines brightly, but if the river is muddy so as to protect them, or the days are very dark, they will be carried long distances. We have here

one more reason for what has been known a long time on other grounds—the necessity for plenty of light in houses and barracks. In dark habitations bacteria can live, and cause new infection, and this is the experience of troops in dark dungeon-like sleeping rooms. The mortality in old dark prisons is thus enhanced, and the guard-houses in almost all army posts are disgraceful from this cause alone. Wherever moulds grow, we are sure that bacteria have the conditions necessary for life. One of the most valuable rules in war, is to compel each soldier to expose his blankets and clothing to sunlight several hours, twice a week.

In the practical work of disinfection, of houses, clothing, merchandise, mail bags, etc., we use heat wherever we can because it is the most reliable. Experiments prove that moist heat is far more efficacious than dry heat, for bacteria which would live for some time in dry air of 300° F., are promptly killed by even a few seconds exposure to steam of 300° F., that is, live steam or steam under pressure. The moist heat seems to penetrate sooner and kill all living matter. Hence disinfecting plants are nothing more than huge iron tanks into which the infected articles are placed, hermetically closed and steam turned on. We do this even in the case of articles of clothing which will be more or less damaged by the heat. Burning up the articles of course disinfects them. Where a very high dry heat is possible as in glass-ware, iron, etc., it is best to do so, hence these articles can be placed in ovens and submitted to a temperature which would ruin or even destroy clothing. Where heat is not possible, as in the interior of rooms and ships, we use a chemical germicide. The most generally useful is a solution of corrosive sublimate, one grain to the ounce, and either by mopping the walls or flushing them with a hose. Lime is a powerful disinfectant, and therefore whitewashing a wall most effectually disinfects it. Paint in the same way covers up and destroys infection on walls. Gaseous disinfectants are not reliable, the new formaldehyde will, if enough is introduced into a room, disinfect the surface of everything it reaches, but it will not penetrate either a blanket or a mattress.

In the field it is safest to burn up all infected articles, as in yellow fever or small-pox. Bed clothing can be boiled or soaked

in corrosive sublimate if we have the utensils, but we generally will have no conveniences. Where latrines cannot be sprinkled daily with dry earth, lime should be used, or better, chloride of lime, for the germicidal effect of the chlorine gas evolved. It cannot be too often repeated that in the field it is far better not to have any decaying matter to disinfect. Such materials should be daily burned or buried. When we cannot do either, and cannot get the latrines far enough removed from the tents, we will have to run the risk of disease, just as the soldier has to run the risk of being struck with bullets.

So many bacteria are killed by drying them that we should look upon dryness as not only a most valuable antiseptic, but actually as a disinfectant. Dry camps are healthy ones as a rule, and wet ones unhealthy.

As above explained, yellow fever is about the only epidemic disease in which we can depend upon cold as a disinfectant. Though cold prevents and stops malarial outbreaks every winter, it does not kill the germ, which develops the next summer with unimpaired vitality.

It is very evident from what has gone before that some bacteria are hardy and rugged and difficult to kill, while others are delicate exotics difficult to keep alive. Among the former are the ordinary germs which cause suppuration; we carry these with us constantly; they are everywhere present and surgery is one long fight against them. Among the exotics are the pure parasites, not all of them, of course, but some of them. Now suppose a parasitic germ is so delicate that it is killed very soon after it leaves our bodies. That is, it cannot stand reduction of temperature or drying, or some other condition outside of our bodies. We cannot contract such a disease unless we get the fresh live germ by direct contact with the person who has it. Now we very rarely come in close contact with another person except in sexual intercourse, in the venereal act, and this is therefore the manner in which these delicate exotic germs are carried from person to person and they are consequently erroneously called venereal diseases. I say erroneously, because it is perfectly possible to get these diseases by methods of contact other than sexual, and thousands upon thousands of cases are recorded as having been so infected innocently, as a child

from its nurse, or *vice versa*, or in kissing; or in physicians, surgeons and nurses in handling their patients. Ordinary handshaking is harmless, because the skin is a thick protective armor.

The gonorrhœal germ dies so soon after it leaves our bodies and requires such precise conditions to grow in our laboratories that for a long time it was considered a pure parasite incapable of existence outside the body though we now know it can be grown in appropriate media. Nevertheless it does not instantly die, neither does the undiscovered germ of syphilis, and it is perfectly possible to get the infection by other ways than actual contact, providing of course that but a short time elapses between the discharge of the germs from one man and their reception by the next. This is called mediate infection. On account of the delicacy of the germs, cases of mediate infection in comparison to the cases of immediate infection are extremely rare. If the germs lived a long time after leaving the body, we would get these diseases anywhere and they would no longer be called venereal. Cases of mediate gonorrhœa are so rare that we may dismiss them as curiosities of medicine, and cases of mediate syphilis if investigated will show that so short period has elapsed in the journey from one person to another that we may reasonably call them immediate. In a great work upon the subject of innocent infections, many epidemics of syphilis are described, where a syphilitic professional tattooer has infected every customer with saliva, or where glassblowers have taken it from the long tube passed from mouth to mouth, or men have smoked the same pipe, or families of peasants have used the same spoon at dinner, etc. If the germ survived none of us would be safe, for in some parts of the world one man in every five and even one in every three has syphilis, and in a hotel we are certain that once in every ten times we run the risk of using forks and spoons that have recently been in the mouths of syphilitics. Thousands of boxes of cigars are made by syphilitics and the cigars infected. Yet infection with syphilis from hotel utensils or cigars is so extremely rare as to be a danger which we may dismiss at once. Even dentists who formerly never disinfected their instruments rarely carried the live germ from one mouth to the next. When we do find the germ of

syphilis which has so far eluded us, we will find that it is one of the most delicate germs in existence, probably killed by drying and chilling.

Now the military lesson to be learned from all this is the needlessness of all that foolish dread of soldiers in barracks affecting one another, through the closets, etc. The gonorrhœal germ can be easily carried to the eye by a wet towel used in common, but soldiers have their own towels, and cases of gonorrhœal ophthalmia are generally in men who have infected themselves, of course omitting the terrific number of infants who are infected during the process of birth. I have personally never seen a case of gonorrhœa in a soldier contracted except in sexual intercourse, and upon inquiry have failed to get records from the Surgeon General's office of any, though of course there may be some. But considering the large number of soldiers who have the disease and who never apply for treatment, we can rest assured that the proportion of cases innocently acquired is probably not one in 100,000. They are so few, that the popular idea of the great danger seems ridiculous, and leads to that great demand to isolate every case, a demand which is one of the very reasons why cases are concealed. The soldier objects to being considered in the same light that the ancients regarded lepers—to be cast out at once as dangerous—and he rightly objects because he isn't dangerous, and he feels perfectly justified in concealing his condition if he can, in spite of our rigid orders. When we cease to consider him a criminal in dishonor, he will come to the surgeon for treatment; now we get very few of them. Indeed, the germ of gonorrhœa is so easily killed, that if we only wash out the urethra frequently we can cure the great majority of cases in seven days, if we get them early. Statistics of all cases, severe and mild, show that by irrigation with germicides, 60 per cent. are well in ten days, 30 per cent. in two weeks, 5 per cent. in a larger period because of indulgence in sexual intercourse or alcohol, or both, and the remaining 5 per cent. stand recorded as failures. At the present time we are in disgrace from the length of time the soldiers will carry this disease.

Cases of syphilis contracted innocently are extremely rare in the army. Upon request the Surgeon General has furnished

me with three cases reported since 1885. One was a surgeon, who contracted it while operating upon a syphilitic soldier (immediate), one was of a nurse, who is belived to have got it from a dentist's instrument (mediate), and the third a soldier, who is said to have got it from a barber, who in shaving him cut a mosquito bite and infected the wound (mediate). Other cases may have occurred, but it is difficult to get at the data. Nevertheless, we see how extremely rare it is to find a syphilitic soldier infecting his comrades; only one, and that involved in doubt. How foolish then is our idea of the danger of allowing syphilitic soldiers in the barracks, and how absurd our precautions for such a slight danger. Even surgeons have this needless dread, and one such was so afraid of it that he has been known to stand off six feet in examining a patient. It has long been known that it is far more dangerous to take a ride in a railway car, than it is to take an anæsthetic like ether, because a far larger percentage of passengers are killed than the percentage of patients. Likewise we can state from the above facts that the risk of being sickened or killed on a practice march is 10,000 times greater than the risk of getting syphilis in the barracks from another soldier. Then, again, as the disease is nearly always readily cured, and even if not cured is rarely if ever transmitted to the third generation, we may well stop that foolish dread which so often visits harsh measures and dishonorable discharge upon unfortunate soldiers. A failure to cure the disease is generally, though not always, a reflection on the competency of the surgeon. Finally, we positively refuse to accept recruits unless they are sexually perfect, because others would not make good fighters. They are young men in whom sexual passions are at their very height, and we are in duty bound to protect them. We would not dream to put poisoned food where a child of four could get it to satisfy its appetite, and yet we expect these men to be continent in a passion infinitely more powerful. The British are now suffering for their brutality in this regard, and ever since they have, in obedience to the demands of a lot of fanatical old maids and old men whose sexual life is dead, neglected to protect the boy soldiers sent to India, their army is well-nigh disabled from venereal disease. Boys need protection for a long time on account of the natural vio-

lence of this passion, and to refuse protection, or to treat them as dishonored if they fall, is not a trait of Christian character. As men grow old they forget the violence of this passion in the young. We can do everything possible to protect these headstrong boys, without in the least countenancing immorality. We must repress vice at all times and at any expense, but we must care for the sick, no matter what the cause. It is certainly illogical to treat with the greatest care and sympathy a man who contracts typhoid in some low dive, and cast out as unclean his companion who gets some other infection. Even the lowest criminal in our penitentiaries gets careful medical treatment when he is sick, yet an army is the only place in christendom where we put obstacles in the way of curing a sick man. Christians shouldn't be so squeamish, for the man they follow protected the woman taken in adultery. Venereal disease will exist in any army well on towards the millennium, and by that time we will have no use for soldiers. Until then we cannot eradicate it by any means short of universal castration of recruits.

Other parasites higher in the scale of life are just as easily killed as parasitic bacteria, that is, the true parasites, not the facultative parasites like bed-bugs, which can live on other foods than those supplied by a live host. The itch insect, for instance, is very delicate and is killed by chilling. Infection results from personal contact. If the animal is carried to a new person, a short interval of time is necessary, or if a long period ensues the animal must be protected. Otherwise, if the animal were hardy, we could get the itch very easily, and it would be a widespread disease. I have seen no reference to the ease with which the numerous species of body vermin, lice, crabs, etc., are killed; but from analogy I would presume that they are equally delicate. Indeed, I have never seen a case of such infection in which there was not a history of a personal contact with an infected person. Even such parasites as tapeworms are killed as soon as they leave their habitat, though of course their eggs are exceedingly resistant and live until taken up by another animal.

We must now take up a few facts to dispel that wretched dread of all bacteria, which has taken such possession of the popular mind as to amount to a mania, a bacteriophobia. In the first place, we have already seen that the great majority of

all bacteria are beneficent, and sanitarians encourage their activity in destroying decaying material, and we should not dread the best friends we have in the world. Some of these bacteria are of vast commercial importance, because they give the particular odors and tastes to the various kinds of cheese, Rochefort, etc. Even butter is vastly improved if we have the cream infected with the proper kinds, and laboratories are now in existence for cultivating these germs, which are sold to dairymen, who introduce them into the milk or cream, and the butter has such an improved taste and odor that it sells for a much higher price. In the next place, there are quite a number of bacteria which live on and in our bodies permanently, and which must serve some useful purpose. The mouth is a veritable hotbed of these plants, and their use must be to dissolve out those particles of food which collect between the teeth, and which we cannot remove ourselves. If it were not for these, the teeth would eventually become clogged up with these remnants. The more cleanly we are, the less food there is for the bacteria and the sweeter our breath. The actual odor of the breath depends in part upon the species of bacteria present, for they all do not produce the same substances. In the intestine there are numerous species and varieties which are harmless, and it is believed by some scientists that these species have some beneficent effect upon digestion. In the skin and in the sweat glands there are still others, and perhaps they help to keep open the orifices of the sweat and oil glands by dissolving out materials which are rubbed in. In savages who do not bathe, they may even assist in keeping the skin clean. A like use is made of many tiny mites by the lower animals. For instance, the common domestic fowl is kept clean by little animals of the family *litho*, which carefully scrape away and eat the scarf skin and other epidermal débris, that would otherwise impair the health of their hosts.

Many of our body bacteria are probably illustrations of commensalism, or the living together of two widely differing animals, each of which serves a useful purpose to the other. It is a modified parasitism, carried to such an extent in some cases, that if one animal is withdrawn the other dies. Together with these harmless varieties there are no doubt numerous disease

germs on our bodies, so that the dirtier a man is, the more apt is he to have a dangerous infection with every wound he gets. This is one of the reasons why wounds in warfare are so much harder to heal than in civil life. Just before battle the soldier is apt to be very dirty simply because he has been hard pressed and unable to bathe for a long time. He carries into battle with him the germs which are to infect his wounds and kill him. (Our experience in the Spanish war shows that with modern surgery even this danger of skin infection is nothing, for the results of our surgery have been superb—the cases of infection being very rare.) Then as to disease germs thrown off from an infected person, we are getting more and more expert in killing them and preventing their spread. This is the work of boards of health, in which they have done so much good in recent years, preventing so many epidemics. As for those germs which escape the boards of health, such as the germs of pneumonia, consumption, the grippe, etc., we are assisted by the natural germicides, drying, cold and sunlight. Every time a consumptive expectorates, he throws out millions of tubercle bacilli, and in a crowded city we are quite sure that the dust we breathe is laden with them; yet they are mostly harmless because drying kills them. They are dead when we breathe them. Of course it takes time for them to die, and with the myriads of dead ones we breathe in, there must be fresh live ones and there is danger to public health from the indiscriminate expectoration of consumptives, and boards of health are justified in declaring it an infectious disease and its sufferers a danger to public health. For similar reasons a soldier with consumption should be discharged, as he is a danger to his comrades. Though we know that much sickness comes from the dust of dirty streets, yet the danger from dust in general is not nearly so great as we once so confidently believed. The presence of live germs floating in the air is seen in the fact that milk and other putrescible materials decay almost at once after exposure to the air. Perhaps many disease germs are also present and need only favorable conditions to cause disease. Though old paper money is filthy in the extreme, yet it is so dry that the danger of its carrying infection is not nearly so great as we once thought. Even though we are surrounded by bacteria we have powerful de-

fenses. The skin is impervious to them, and the external mucous membranes nearly so. The air we breathe is filtered and but few or none enter the lungs.

Even if we do take into our bodies a certain number of disease bacteria we are perfectly able to kill them, providing they are not too numerous. Some die promptly as soon as they enter the stomach, where they are literally poisoned by the normal stomach juices. Experiments prove that even the cholera bacillus can be swallowed in large numbers with perfect impunity if the stomach is healthy. But let the stomach be deranged by drinking alcohol immoderately or in any other way so as to alter the stomach contents and destroy its germicidal properties and the bacilli pass through into the intestines unharmed, multiply prodigiously and the man dies of cholera. We explain many cases in this way and it is a great reason for temperate living in times of epidemics. Still other bacteria are promptly killed by the germicidal substances of the blood or of being eaten up by certain cells which we call phagocytes. If a man is perfectly healthy these barriers are of great strength, as we know almost by daily experience. We know that a man may cut his finger and infect it, yet it promptly heals up without suppuration, because the bacteria introduced have been promptly killed by the germicides in the blood. If the man is not vigorous this action does not take place and we see every scratch or cut "fester." We have here still another reason why ill-fed, fatigued soldiers have their wounds so easily infected and why so many of them die. They have not vitality, we say, but it is their inability to fight bacteria. How important then to have our soldiers well fed, vigorous and even fat. If wounded, they come out of hospital quickly and take their places in the ranks instead of going home on furlough for a long recuperation.

Then again sickness or drunkenness temporarily reduces our resistance and bacteria introduced at that time have a free field. That is why pneumonia is so common in men after a spree. The germ is constantly present in the mouths of nearly 25 per cent. of all people, but it never gets a foothold in the blood or lungs until we deliberately cast down the protective wall which keeps them out. Old age is a period of less resistance to germs, and a very large percentage of old people die of pneumonia,

after having carried the germs with them probably all their lives. Certain diseases reduce our resistance, and after one infection we are in the best condition for taking another. After measles children may be carried off by almost anything. Pneumonia is very common in serious cases of typhoid fever, for the ever present germ can now beat down the barriers already weakened by the typhoid fever. Yellow fever of itself is not very fatal, for the germs die out in the body in a short time, but by that time the body has no resistance and in a few days becomes a veritable hotbed for all kinds of bacteria. Death usually results from these secondary infections after recovery from the original infection. All these facts show us how important it is to keep ourselves in "good condition," and what a fatal mistake it is not to keep soldiers well fed when in the field. Troops which are ill fed are a veritable harvest for bacteria and can be destroyed by infections which well-fed troops easily resist. The field ration then should be as near the garrison ration as possible, fresh meats, fresh vegetables and fresh fruits—all three if possible.

It is rarely remembered even by physicians how little change may be necessary in order to destroy our ability to resist bacteria, though we constantly hear of men being so run down that they could "take anything." In the lower animals it is a matter of demonstration. For instance, anthrax never attacks chickens or frogs, the blood of the former is a trifle too warm for the bacteria and the latter too cold, yet if an infected chicken is chilled by being compelled to stand in cold water so as to reduce its temperature a few degrees, it promptly dies of the disease, and if an infected frog is kept warm it also dies. Relapsing fever rarely appears except in famines and typhus in the underfed and overcrowded. In the tropics only the badly fed who live in unsanitary surroundings, contract beri-beri, a very fatal disease, yet if the cases are well fed and removed to cool high ground the great majority recover. In other words, pathogenic bacteria require such precise conditions for their growth that, if we keep ourselves in good condition, we can resist almost all of them, our whole lives indeed being a constant warfare between our tissues (phagocytes) and bacterial enemies. The less the vitality, the more severe the infection when the bacteria do

obtain the upperhand. For instance, in alcoholics we expect almost every infection to do badly.

The question of immunity is entirely too complex a subject to be enlarged upon here, but we may say that after certain diseases, as small-pox, scarlet fever, yellow fever, or measles, the blood and other tissues are left in a condition whereby they can promptly kill the germs of that disease so that a second attack is very rare. This is acquired immunity. Race immunity is the natural inherited form. Sometimes immunity from one disease is produced by infection with another allied disease. Small-pox is surely prevented for awhile by vaccination. Unfortunately this immunity wears out, sometimes in a few months, though generally it lasts several years. If we could vaccinate every child in the world and re-vaccinate them in a few years, the small-pox germ would become extinct—starved to death. Vaccination and re-vaccination of soldiers is an essential.

A very interesting side thought is the fact that by the very law of the survival of the fittest, and the death of the most susceptible, men are gradually becoming immune to a great many diseases. Many affections are already very mild, such as the diseases of childhood, and even syphilis itself is less virulent than formerly. It may eventually die out. The worst cases are apt to be in degenerates and other defectives.

Notwithstanding the fact of our having defenses, we should never deliberately invite the enemy to enter. So that as a practice of daily life, we should never put any infection in the mouth if we can help it, and no one should carry his hands to his face if he has touched infected materials. It is a good rule to keep the fingers out of the mouth under all circumstances. Bacteria are splendid servants, but some are tyrannical masters, and we should never court their intimate acquaintance any more than necessary. Those known to be harmful should be ruthlessly destroyed, if we can do it. Bullets are usually sterile because of the care and cleanliness needed in making them. Hence of themselves they rarely carry infection into a wound, but they often infect wounds by carrying in pieces of dirty clothing. It is possible for ricochet bullets to pick up dirt and carry it into a wound. As the germ of tetanus lives in the soil of thickly settled countries, we explain in this way the

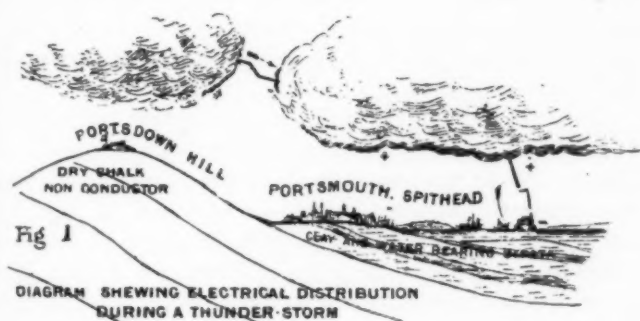
great numbers of cases of lock-jaw after some battles. Now infected bullets are not sterilized by the heat of the barrel or friction, or heat of impact, and can carry infection as experiments prove. It is the object of warfare to disable the enemy and not necessarily kill him. We only kill him when we cannot capture him or stop him fighting in any other way. It is certainly diabolical to deliberately infect bullets so as to kill the enemy by blood poisoning. That is equivalent to the savage's poisoned arrows. Hence we should discourage the habit soldiers have of moistening bullets with saliva, for we thus may introduce a fatal infection. It is like expectorating into the wounds we make. It is a dirty practice to say the least, even if we think it a ridiculous refinement to try to prevent it.

An item of military importance is the fact that by changing the environment of a species of bacterium, that is its food, temperature, moisture, light, air, etc., we can change its characters in a very marked degree. Sometimes virulent disease bacteria can be made so harmless that we may inject large numbers in the blood and produce immunity. On the other hand comparatively mild bacteria can be made so virulent that a small number will be quickly fatal. This is of military importance, because crowding men together so that bacteria can be carried directly from one to another without weakening their virulence by a saprophytic existence outside our bodies for a time, seems to increase the virulence of the germ to a wonderful extent. Those causing diarrhœas, dysenteries and typhoid fever, seem to be of this class. Perhaps also small-pox and surely ophthalmias and measles. Hence these diseases are of special virulence in armies, and we have to go to extreme lengths to prevent them getting a foothold by isolating the cases as we would the most virulent infections in civil life.

PROTECTION FROM LIGHTNING.

(A COMPILATION BY A MEMBER OF THE MILITARY SERVICE INSTITUTION OF THE U. S.)

WE find in Bucknill's paper, read by invitation of the Council of the Royal Service Institution, and published in its Journal as early as 1880, that, "At Portsmouth it has been noticed that although severe thunder-storms often occur in the vicinity, the clouds move round and seem to avoid the Portsdown Hills, which are of chalk and possess few trees." This relation ("earth" to "storm-cloud") is expressed by diagram (Fig. 1), the electrical distribution (shade



lines) showing a storm-cloud over the chalk hills much less charged, than one over the lesser elevation of better conducting area.

From this it appears to be much more necessary to provide lightning conductors for structures located on damp clay or boggy bottoms than for those on poor conducting media; a convenient circumstance, in view of the fact that it is almost, if not quite, impossible to make efficient earth connections in the latter situations.

In general, it is understood that clouds over portions of the earth's surface which are unfavorable for inductive action give up their electricity to other clouds, the lightning playing from

cloud to cloud until those which are situated over the earth's conducting surface become so highly charged that the electricities are able to overcome the resistance of the intervening air and to unite across by disruptive discharge.

Electrical discharge takes place through particles of air, under polar tension, subjected to high strain by static induction, and traverses the air in the direction of its polarity: the tendency therefore is, that lightning will strike normal to the earth's surface.

Since electricity of high potential leaks, as it were, from conductors provided with projections in the nature of points where the electrical density is greatest, and a stream of electrified air is thrown from such points, by multiplication of points the brush discharge results.

This brush discharge is frequently so intense as to be luminous at a height of 6 to 8 inches, and, being attended with no appreciable heat, its action is generally fostered, warding off, as it does, dangerous strokes of lightning by harmless neutralization of opposing electricities.

In referring to the importance of adequate protection for powder magazines from lightning, Bucknill further says, "Imagine the loss to the war strength of the empire which would be entailed by the accidental explosion of one of the large magazines at Tipner or Priddy's Hard with its charge of, say, some 750 tons of gunpowder or over 750 millions of foot tons of energy developed in less than one second of time, and this within a short distance of one of the greatest naval arsenals in the world and a town of 130,000 inhabitants."

In this connection we should consider the several systems employed for the protection of magazines, oil tanks and monuments.

An American plan, the invention of C. J. Hubbell, has been favorably indorsed by several Professors of Physics and Chemistry at leading universities.

Experiments with this system were conducted as early as 1885 by Prof. Friscoe, at the Columbian College, Washington, D. C., and by Prof. Plympton at the Polytechnic Institute, Brooklyn, N. Y.

A model oil tank of copper, on a scale of ten feet to the inch,

was used for experiment and a principal static electrical machine employed as the source of electricity.

A circular piece of copper, supported some two feet above the tank and electrically connected with the positive pole of the machine, represented the storm-cloud, the negative pole (connected with the tank) the earth current. A rubber tube affixed to a gas jet and the interior of the tank supplied the necessary hydro-carbon vapor. When the machine was set in motion a series of disruptive discharges from the artificial cloud struck the tank, igniting the vapor at each discharge. A single point, the height of which covered the radius of the tank, was then placed upon it and disruptive discharges continued to the point* until by moving the cloud about, and away from the single point, the edge of the tank was struck and the gas ignited.

The Hubbell system was then applied and tested on the miniature scale. We should first state that the Hubbell patent for the protection of oil tanks against lightning calls for four poles 65 feet high, so arranged that the cross-lines from the upper terminals of opposite poles will intersect the centre of the tank. The tank itself, 90 feet in diameter and 30 feet high, is made of iron, and is capable of holding 35,000 barrels of petroleum.[†]

The poles are placed 20 feet distant from the tanks, a conductor of copper, or its equivalent, in iron, is affixed to each pole, extending some three feet above it and surmounted with a high sharp copper-tipped point, to a good earth terminal; a horizontal conductor is stretched from the top of each pole, upon which conductor are a multitude of points, the horizontal conductor constituting what is denominated the "electric circuit belt" or "brush discharger."

So far it might appear that the Hubbell system of conductors are practically *insulated*, being separated from the tank, as was the case, in past years, when poles with conductors thereon were

* Innocuous discharge since this point constituted the upper terminal of a well-grounded conductor.

† It is stated that inasmuch as the hydro-carbon vapor surrounding the tank is very combustible, the loss from lightning incident to the electrical conductivity and elevation of this vapor has been enormous.

placed around and detached from the magazines to be protected. This however is not the case, since around the tank a similar conductor or circuit belt, but without points, is placed some 10 feet above it and supported by metal rods *at the tank*, connected to the tank as well as with the outer or pole system of conductors and thence to the subterranean sheet in which the receiving and distributing pipes intersect the perpendicular conductors.

By the absence of points on the interior circuit belt, there is no effort made to neutralize the two electricities of the earth and of the storm-cloud directly over the tank and in the region of the dangerous hydro-carbon vapor, but at a distance therefrom (this distance being determined experimentally), thereby withdrawing instantaneously through the metal connection all the induced electricity from the tank, by a continuous silent discharge at the upper terminals and thus preventing disruptive discharge.

In the course of experiments in a darkened room, a continuous silent flow, or *brush*,* from the upper radii of points surrounding the tank was observed, but at a distance from it—that is, out of the range of the escaping hydro-carbon vapor.

It was also shown that the human hand could be placed with impunity upon the miniature tank, since all of the electricity was drawn, as it were, away from the tanks to the points on the upper circuit belt and thus dissipated, as before stated, in a brush or silent discharge.

It was claimed, though not demonstrated, that had but a single point been affixed to the tank during the discharge to or from the artificial cloud, that the charges employed for the experiment were sufficient to kill a person who might have had the temerity to place his hand on the tank. As a further illustration of the safety and efficiency of the “brush” discharge, a full jet of hydro-carbon vapor was applied to the

*“ Mr. Wilcke, as long ago as 1758, observed that thunder clouds, in sweeping at low elevations over forests, not infrequently appeared to lose charge without the occurrence of lightning. The under surfaces of such clouds at first present a serrated or tooth-like appearance, which gradually disappears, the teeth retreating into the cloud, and finally the cloud itself rising away from the forest. In such cases the numerous points on the branches of the trees facilitates the brush discharge on an extended scale.”

brush or flow at the points of the electric circuit belt but without ignition.

Efforts have been unavailing to discover the cause and to avoid the danger from "spontaneous combustion" in oil tanks, but Hubbell attributes such explosions, correctly or otherwise, to the electric spark, "one kind of electricity being generated (as he says) at a distance and carried by the receiving and distributing pipes to the tanks, where the neutralization of the two electricities, taking place in the very region of the hydro-carbon vapor, a spark is engendered which creates an explosion."

In the application of the Hubbell system for the protection of magazines, it is provided that the conductors and buildings be *well connected*, hence there is no apparent reason why the conductors should traverse poles in preference to passing along and in contact with the roof and sides of a structure. There was a time indeed when poles were used for conductors with the intent to detach them from the magazines to be protected—that is, during the period when the mistaken *principle of insulation* prevailed, and conductors when attached to buildings were always provided with insulators. At that time there was no inconsistency in carrying the conductors on poles slightly removed from the buildings. It must however be quite apparent, now that insulation is an exploded theory, that, when the exterior parts (metal or otherwise) of a structure are linked to the conductors on poles, as they are in the Hubbell system, electrical discharge through such conductors can be attended with no less risk, if any, to the building to be protected than where the conductors are placed in immediate contact with the structure itself.

The only real advantage then of the Hubbell system must therefore be found in its "electric circuit belt," or "brush discharger," a principle of protection which, in its practical application to magazines may be difficult as well as expensive, to maintain. The poles are liable to rot and in exposed positions may be blown over against the structure, whilst the horizontal metal belt is itself, more especially after being weighted with sleet and ice, calculated to require constant repairs.

Where, however, there is a dust-laden atmosphere or electrical conducting vapor, this system should possess certain merits, but its superiority over the other and approved systems

is not manifest where magazines or other *closed* buildings are to be protected.

A brief description of the system adopted in this country for the protection of gunpowder magazines it is thought may be of interest in this connection.

The latest and most approved plan of magazine covers an area 200×50 feet, and, in addition to the masonry, includes within it some 200,000 or more pounds of structural iron, with a roof covering of galvanized iron.

There is provided for a single magazine 2000 or more feet of lightning conductors with deep wells and adequate ground connections.

The *exterior* metal parts consist of roof truss and sheet iron covering, — windows and doors. The *interior* metal parts, of ceiling and floor beams with supporting columns. In providing that all the exterior metal parts such as doors, windows, etc., should be well "connected to the ground system by galvanized iron straps equal in cross-section to the conductors themselves," it is specified that "the girders and columns should not be connected either with the earth or external system of conductors." Authorities are about *equally* divided on this point: some contending that interior metal parts *should be* connected with the ground system of conductors, and in the plan adopted for the protection of certain monuments this practice has been followed, the conductors passing through and in contact with, the hollow columns supporting the elevator.

There is much to be said on both sides of the question. It cannot be denied that all parts of a structure located on good electrical conducting media may be inductively charged, and if so, then in proportion to the degree of their conductivity. This occurs in the vicinity of a storm-cloud, the earth side of which repels all electricity of its own kind and attracts the electricity of the opposite kind to these parts. This then being the case, an apprehension is entertained that at a time of silent discharge through the exterior conducting system or at an instant of disruptive but innocuous discharge through the same conductors, the separated interior metal parts may discharge in a disruptive and destructive manner, in some degree at least, calculated to ignite powder stored in magazines. On the other hand the

question suggests, if the joints of an interior and exterior metallically connected system be perfect originally, will they always remain in that condition? If the metal powder barrels should also be brought into the *connected* system, as they should be in such system, might not the dislodgment of one barrel jeopardize the safety of the building more than the plan which provides for the absolute separation of *interior* and *exterior* metal parts?

In the latter plan there is, as will be seen from the following description, a complete enveloping cage of exterior conductors, so complete, in fact, that during the continuance of a thunder storm a silent flow from the storm-cloud to the moist, subterranean layer or the reverse, should obtain, with but little risk, if any, of developing internal disruptive discharge.

Service magazines to contain 500 tons of gunpowder are at present provided with five conductors. One-inch galvanized iron wire rope, well painted, being preferred to copper for "the reason that its contact with the galvanized iron roof, whether direct or through the medium of hold-fasts, which should be of the same material as the conductor, would be liable to set up galvanic action, and thereby cause injury to the roof, or to the conducting power of the hold-fasts or to both." The inferior conductivity of iron in the conductors as compared with those of copper is compensated by increased cross-section (6 to 1) and thus having a large mass of metal of higher fusibility than copper, a much higher fusing point is presented for the passage of the current.

The conductors that run from the ridge continuously down opposite faces of the building are connected by soldered (zinc) joints with a cast-iron water pipe 10 feet long and one foot in diameter, inserted in a wet well; the central and extreme conductors passing through the water spout. The curvature at the eaves is so adjusted that the length of the curved portion does not exceed one and one-half times the distance between the initial and terminal points of the curve, so as not to admit of disruptive discharge between the straight parts.

The upper terminal of each conductor is a one-inch galvanized iron rod with beveled edge and gilded extremity surrounded at one foot from the end by an iron collar secured and soldered

to it, holding six equi-distant, fine-pointed, beveled and gilded,* iron wires six inches long. The length of the terminal rods does not exceed six feet.

The vertical portions of the iron rope are connected by a horizontal rope of the same kind and size, passing around the building and immediately over the water table, so that if one of the vertical ropes be injured, all the others of the system act to aid it.

The hold-fasts are of iron, and allow free movement of the rope in expansion and contraction. The rope passes through a wrought-iron T, the galvanized iron rod resting in the vertical part of the T and well soldered thereto, making close joints.

The metal doors and shutters are connected with the ground system of conductors by galvanized iron straps equal in cross section to that of the main conductors. Advantage as before stated has been taken of the down spouts (three on each side), the central and extreme conductors passing through them and following under the surface drains to the "earth" or iron pipe to which the conductors are soldered. A moist surface earth in proximity to the conductors is thus secured almost immediately after the commencement of rain. With a view of increasing this contact the iron pipes or conductors are carried underground for some distance from the building before passing downward to the deep earth.

The deep "earth" itself, as before stated, is a cast-iron water pipe, with a collar into which the wire ropes are entered in holes made for this purpose and the ropes are securely soldered thereto.

The pipe is 10 feet long and a foot in diameter, thus affording an exterior surface of thirty feet, which is considered ample, in view of the fact that it is placed in a well always moist and filled in and around the pipe with coke.

The floor and ceiling beams as well as the columns of the magazines, for reasons before specified, are not connected with the external system of conductors, which latter are fastened by hold-fasts to the galvanized iron roof which covers and is in close contact with the roof truss.

* Gilded to prevent rust; fine pointed to facilitate silent discharge, and beveled to take disruptive discharge without fusion.

The following illustrations and suggestions are in the main obtained from Bucknill's paper before referred to, and are thought to be of interest in connection with this subject.

The Académie des Sciences has on different occasions issued information on the subject of lightning conductors, the instructions being the results of labors of various commissions of celebrated physicists.

The first instructions, in 1823, with Guy-Lussac as reporter, indicated that "a conductor will effectually protect a circular space the radius of which is twice the height of the rod," this rule being in accord with calculations by M. Charles.

In 1854, a second commission of members of the Académie des Sciences, M. Pouillet as reporter, no longer sustained the early instructions of 1823, holding that the area of protection cannot be defined, "being a variable, and dependent upon a multitude of circumstances," chief among which is the degree of efficiency of the earth connections.

Mr. Preece, in a paper read before the British Association (1880 or thereabouts), revived the theory of 1823, but in a modified form, assuming, however, that a thunder cloud will never be nearer to the earth than the height of the lightning rod. This is open to question, as very *low lying* thunder clouds may be driven by the winds into the neighborhood of lofty conductors. This is corroborated by a case recorded by Mr. Anderson, where the belfry of an edifice, 115 feet high, "remained standing out clear above the thunder cloud, whence issued lightning which killed the priest at the altar of the church."

Objections have been made to the proposed method of protection for one of our monuments, on the same ground.

The plan provided for a number of platinum tipped points upon the summit, all to be mechanically connected together, and with a copper rod of one-half inch cross-section and several feet in height in the centre of the interior of the shaft: to the lower end of this copper rod four copper rods of one inch diameter were to be connected by a washer and to extend either through the four hollow iron columns that support the elevator, to the ground, or else, connected to the columns and coming together in a well.

It is held with some show of reason that an electric charged

storm-cloud midway the monument might not discharge through the points of the conductor on the summit of the monument, but would probably tear through and dislodge the masonry in following the line of least resistance, or interior metal conductors. In other words, the actual line of least resistance would be established *through the masonry* directly to the interior metal conductor, rather than lead up through the atmosphere to the upper terminals of the conductors and thence on to the earth.*

We may here remark that there is a common but by no means unjustifiable notion that "metals *attract* lightning," and this is due to the fact that they are indeed all more or less good *conductors* of electricity, just as pipes or roof gutters are good conductors of water, although in no sense attracting it. The distinction however between electric attractiveness and electric conductivity may appear as one without a difference, since the electric current finds its line of least resistance through metals in its path, rather than through more resisting substances.

The following may elucidate the point of difference:—

Take the case of a metal bicycle with *dry* rubber tires resting on moist earth under a tree, through which has passed a disruptive electric discharge. The metal of the bicycle having within it no electric *attractiveness* remains uninjured. If on the other hand the tires had been wet, or better still for the sake of argument, if they had been stripped from the machine, located as before on a moist "earth," the chances are that the line of least resistance might in that case have developed along this metal route, the rider, if there were one, though shocked probably by the neighboring disruptive discharge in the first must have been killed in the second instance. If then a metallic body when insulated cannot *attract* electricity, but may *conduct* the fluid, if not so insulated, nevertheless its conduct-

* It has been suggested for the protection of monuments from lightning that a system of double electric circuit belts be provided, each with numerous points, the one belt on the summit and the other midway of the shaft, the whole connected with outside conductors well grounded; and in addition thereto, an interior conductor in one corner of the structure having a cross-section equal to the sum of the areas of the four outside conductors, and metalically connected therewith.

ing property must be estimated only by the degree of conductivity of the contact medium.

In this connection, Sir W. Snow Harris says :—

“Buildings are struck by lightning only because of their being points in one of the terminal planes of great electrical disturbance, not because of any nature of *attraction* of the substance of the elevation.”

Properly constructed conductors simply *remove by the aptness of their parts* the resistance which is experienced by the electric discharge in moving through less perfect conductors, and hence prevent the damage attended on obstructed action.

Should an object without a lightning-rod or good conductor be so conditioned, that is, at the point of flow or discharge of the electric current, it will be “struck by lightning”; if however, it is well provided with conductors the object should escape destruction. A disruptive discharge takes place in the first and either a silent or disruptive but innocuous discharge in the second instance.

A break in the line of conductors usually converts an otherwise innocuous discharge, through the conductor if perfect to one of disruption, and this, not for the reason that the metal of the imperfect conductor *attracts* the electric current, but because it initiates a route of least resistance through the object which might not have developed had the defective conductor been entirely removed from the object sought to be protected; and therefore, it is better to provide no conductor at all rather than one which is imperfect.

Considering the importance of efficiency in “earth” connections conjoined with height of conductors required to protect given areas, Bucknill instances the following.

The Shelton church, England, is constructed with a tower 16 feet square surrounded by four pinnacles 16 feet above the roof. From the centre of the roof springs a large flag-staff 40 feet high. A copper wire rope, four-eighths inch in diameter, is fitted to one pinnacle and taken direct to the earth. The staff projecting 20 feet above the conductor and distant but 10 feet therefrom was not struck, but a heavy stroke of lightning which caused much alarm was seen to fall upon the tower, striking the conductor, and knocking the point slightly out of

the perpendicular, but passing off by it innocuously. In this case a good conductor, well connected to earth, protected something higher than itself but not well connected with the earth.

Again, Sir W. Snow Harris mentions a chimney at Devonport, England, which, although provided with a conductor on one side, was struck on the *other side* and shattered to the level of the metal roof below. "Here the conductor as well as the metal roof must have been badly connected to earth and was, as the sequel showed, entirely useless."

From the foregoing instances it is clear that the safe area rules must vary with accidental circumstances. Thus a house within the theoretical circle of protection given by a church spire near at hand, may be struck, if the line of least resistance from cloud to earth were afforded by a column of rising smoke; or the shorter of two chimneys would most assuredly be struck for a similar reason, even though within Preece's theoretical cone of safety for the taller chimney.

In short, if thorough protection is desired for any building it is necessary to put a conductor or conductors *upon it*, as dependence cannot be had on conductors at a distance therefrom.

A lamentable result of the practice of placing lightning conductors distant from a building, was shown in Jamaica. A lightning rod of small dimensions, of iron, had been set up within ten feet of the end of the building, as was formerly the practice with gunpowder magazines, upon the assumption that the rod would *attract* the lightning and screen the building. So far from this, the building was struck July 28, 1857, while the rod but ten feet distant remained untouched.

If the building had been a deposit for gunpowder it would certainly have blown up. This detached lightning rod construction is in harmony with the now exploded theory that it was necessary to actually separate the conducting rods on the building from the building itself by glass or porcelain insulators. This latter practice is continued now to some extent by "the lightning-rod man," who, whilst pandering to the prejudices of the uninformed at the time, derives additional pecuniary benefit therefrom.

Sir William Snow Harris says: "To detach or insulate the con-

ductors is to run away from our one principle, which is, that the conductor is the channel of communication with the ground, in which the electric discharge will move in *preference to any other course*. To detach or insulate the conductor is to provide for a contingency at once subversive of our principle. Is it possible to conceive that an agency which can rend large rocks and trees, break down perhaps a mile of dense air and lay the mast of a ship weighing 18 tons in ruins, is to be arrested in its course by a ring of glass or pitch an inch thick or less, *supposing its course was from any cause determined in that direction?*"

It has further been agreed that the insulation of lightning conductors is a grave error, in this, that the insulator *may to some extent* arrest the flow of rarified electricity, which it is the legitimate object of the conductor to facilitate. Again, insulators amount to nothing as barriers to a discharge of lightning, which can break them to pieces, and pass over the short distance between them and the building if the ground connection of the rod be imperfect and the line of least resistance is determined over other than the normal route.

In fact, as there are no absolute non-conductors, there can be no absolute insulators; the term being applied to substances which conduct very imperfectly, but are liable to violent disruptive effects when a shock of electricity passes through them.

"The insulation of telegraph wires is not a parallel case. Currents of *low tension* are used for telegraphing. The object of insulating telegraph wires is to prevent the restoring of the equilibrium; whereas the purpose of a lightning conductor is to *promote and hasten the restoration of it*." When a conductor is insulated the "non-conducting" material between it and the building intercepts the flow of currents of rarified electricity from the building (with which it is already charged) to the rod, so that when an otherwise innocuous but heavy discharge takes place from the storm-cloud to the earth along the main conductor, the accumulated fluid in the building may have sufficient tension to overcome the obstacle which the insulators present, and an explosion into or from the building results, a thing that could not transpire if there had been a free flow of rarified electricity from the building as in the absence of insulators.

A lightning conductor is extremely passive in its nature, and

all that there is required to protect a structure from lightning is to provide a series of good conductors upon the various portions of the outside of the building, well connected with it, and having their lower ends brought into intimate contact with the permanent moisture belt, whilst the upper portions must terminate in a number of points to secure a silent discharge.

In selecting metals for conductors it should be remembered that the conducting power of different coppers varies from pure copper (100) through a variety of other brands, such as Lake Superior (98.8), commercial (92.6), down through an extended series to Rio Tinto (14.2).

For this reason it would appear that the limit of resistance should be specified in all contracts as .03 ohms per 100 yards. This would be obtained from iron wire rigging ropes weighing 6 pounds per yard, or copper (80 per cent. pure in conductivity) ropes weighing 1 pound per yard. Iron has about one-seventh and good commercial copper about four-fifths of the conductivity of *pure* copper, hence iron has about one-sixth the conductivity of good commercial copper.

When two "earths" are used, the conductors being carried up one side and along the ridge and down the other side of a building to be protected, the conductor's power may be reduced one-half, *but no greater reduction can be made* when a still greater number of earths are used, since the lightning may strike the conductors at any point. A 3 pound iron and one-half pound copper (per yard) rope is therefore the smallest that should ever be used.

The mass of an iron conductor of equal conductivity with one of copper being greater is heated less by a current of electricity, whilst its fusing point (2786 F.) is much higher than that of copper (1994 F.).

Iron is more constant in conducting power than copper of different samples. A copper conductor, if connected to a cast-iron water supply pipe (to form an "earth"), produces galvanic action to the damage of the pipe, and at the joint imperfect connection and disruptive discharge may follow. It is well in such case to employ galvanized iron to prevent rust, but if iron is used in smoky towns, and not galvanized, it should be painted.

"It is unscientific and wrong to employ large conductors for

high buildings and small ones for low buildings, as the lightning stroke falls no less powerfully on short than on long conductors."

Preece, in considering the best *form* of conductor, holds that ribbons, rods, and tubes of the same weight per foot, are equally efficient.

Frequent joints are necessitated in rods or tubes employing screw collars, and such joints after long exposure to the weather offer very high resistances, especially so in copper conductors; ten to fifteen times as great as the riveted joint in a ribbon of copper (in special test 10,000 ohms, as against 700 ohms resistance). It is well to see that all joints are well soldered with zinc, and it has been the custom in England for the War Department to give joints in a conductor a surface of about six times the sectional area of the conductor, and this is borne out by the French practice, where even with soldered joints, six square inches of surface is laid down as necessary at each joint of an iron conductor.

Copper ribbon possesses this advantage, that by the introduction of suitable bends, expansion and contraction can be allowed for. Iron conductors in the form of tubes or rods are difficult to apply, and if employed must possess a number of joints with compensators for contraction and expansion.

If iron conductors are used, wire rope affords the necessary pliability and continuity. The wires of such rope should not, however, be very small, since if the conductor be left unpainted, oxidation destroys the rope. No. 11 B. W. gauge wire of six or seven strands wrapped around a hemp coil, in a rope $3\frac{3}{4}$ inches in circumference affords a fair amount of pliability and is a reliable conductor.

"In considering the *terminal* point many absurd views have been expressed. They have at times been made of silver or copper, points covered with platinum or with gold, points of so many millimeters in height and diameter, and possessing exact forms have been proposed and have been rejected, as the case might be."

The height of the points above the surrounding roof has been debated, generally resulting in unnecessarily high rods, an error, however, in the right direction.

Lofty rods above petroleum oil wells and tanks, powder and flour mills are most desirable, but these are exceptional cases, the air close to the buildings being, as shown by Hubbell's experiments, frequently charged so as to be dangerously explosive. The English practice is to place a short rod of the same metal as the conductor on the highest point of the building, and bolted and soldered with zinc to the conductor. The top of each rod is provided with several points to increase the gathering power and to reduce the risk of fusion by distribution of the charge whilst likewise facilitating the *brush* discharge. Sir William Thompson, in giving his opinion, says that "a fork or brush of three or four points at the top of the lightning-rod is probably in general preferable to a single point; but of what practicable value this preference may be I cannot tell for certain, although it may be considerable."

With wire rope a point of the same metal may be entered into and soldered with molten zinc to the wires, which have been opened out to form a brush-like arrangement, just under the point.

"The earth connection of a lightning conductor constitutes the most important and difficult portion of the whole arrangement. As before stated, if the electrical resistances of the earth connections be high a conductor, perfect in all other respects, may not only fail, but being a partially good conductor may induce a disruptive discharge, on some alternative and perhaps dangerous route being taken by the lightning."

The Académie des Sciences recommends an iron earth-plate, consisting of four arms on a central bar of five arms in all, each two feet long and of square section—8 inch side—thus presenting a combined surface of 26 square feet, to be immersed in water in a well that never dries.

Professor Melseus used three earths for the Hôtel de Ville at Brussels. One the gas main, the other the water main, and the third a cast-iron pipe nearly 2 feet in diameter, sunk in a well and giving 100 square feet of surface to the water, which was rendered alkaline with lime to prevent oxidation. The total surface of these three earth connections amounts to more than two and one-half millions of square feet.

As the resistance in ohms to an electric current is for cop-

per 1, iron wire 7, spring water 2,800,000, it is well to supply an intermediary between iron and water, such as carbon, the resistance of which is 2500 ohms.

THE PERSONNEL OF AN ARMY.

BY CAPTAIN W. E. WILDER, FOURTH U. S. CAVALRY.

THE consideration of the personnel of an army is so broad a subject that the limits of an essay will only permit a few random shots; and it is hoped that the size of the target will insure their falling within the lines of its border.

The personnel of any profession depends largely upon the rewards it can offer, and our own is no exception to the rule.

The reward may be the applause of a nation, honor, rank, distinction, glory; it may be the preservation of home and liberty; it may be the approval of a sovereign; it may satisfy a love for adventures; or it may be a stipend—a life of comparative ease and penury.

A lawyer must have clients, a physician patients, a priest sinners, and a soldier an enemy, in order to practice his profession. In ours, however, we are paid to keep ourselves in readiness, as well as to practice the more hazardous duties of our calling.

The personnel of the armies of civilized nations are more nearly alike in times of war than in times of peace, because the conditions affecting them are more uniform in the former case than in the latter. As, for example, the conditions that obtain among the nations of Europe, though they are actually at peace, are more like those of an armistice, while in the United States and Canada, we at present live in the midst of the most profound and, some might add discouraging, peace.

The armies of Europe are, comparatively speaking, upon a war footing and the training in marching, manœuvring and battle tactics are as thorough and exacting as though hostilities had actually begun, and the resources of nations in both men and means are taxed to the utmost. Every officer, perhaps every

soldier, feels that the national existence of his people, depends to a greater or less extent upon his faithfulness and efficiency. The personnel under such conditions must average about what it would in war, that is something above the average of the population of the country under consideration. This is more particularly applicable to the enlisted strength, for any rational, able bodied man may follow, while only the few are fitted to lead; and who they are is hard to determine, except by the crucial test of war. An officer may possess a high order of intellect and be endowed with great mental and physical activity and sound judgment coupled with a profound knowledge of the art and science of war, and be able to organize splendid armies and plan brilliant campaigns and still fail as a commander in the field. For though a commander needs a clear head and a quick eye, yet above all he needs a stout heart to keep his head clear at the very time when it is perhaps most needed. It is the first essential that whatever the mind be with which an officer is endowed, that it be coupled with such fortitude that neither fear, excitement nor weight of responsibility can lessen its clearness and activity. A man with half a mind, if he can use it, is infinitely better off than a man with a whole one that is paralyzed.

The army of a country ruled by a military chief, who has the power and discrimination to reward merit, such as the Russian and German empires, has an immense advantage in respect to the selection of its officers over that of a republic with peace-loving and money acquiring proclivities whose rulers are civilians chosen by popular vote. The only possible safeguard in the latter case, at least in time of peace, is selection by seniority. And the great power of brain and enterprise engages in the accumulation of wealth, the advancement of science, literature and art, or is perhaps found striving after political honor and distinction.

Under the former conditions no profession, no calling can hold out to success more dazzling promises of wealth, rank, power and distinction than that of the soldier, and it is probably true, that no other profession upon the whole, commands so high an order of talent.

In a recent magazine article, by Poulteney Bigelow, in which

it was attempted to give an idea of the self-sacrificing devotion of the German officer to his duty, his country and his profession, appeared a group, by Remington, of "Typical German Officers."

Whatever else may be said of the type it is certainly expressive of strength, boldness, courage and intelligence. For such an army there can hardly be any wrong system of tactics.

There is probably nothing more fatal to any service than the lack of interest on the part of its officers in their duties, and nothing more fatal to such interest than lack of promotion; and when this is coupled with the conditions that exist where troops are stationed at small isolated posts, permitting or compelling but a narrow and limited exchange of ideas and little or no competition, for after all, "competition is the life of trade" in any calling, the conditions are most unfavorable to progress.

The only satisfactory and at the same time practicable solution to this difficulty in our service would, I believe, be to retire in the different grades for length of service; as for example, without being so radical as to arouse unnecessary opposition, retire an officer below the rank of major on half-pay after 20 years' service, all field officers below the rank of colonel on $\frac{5}{8}$ pay after 30 years' service, all colonels on $\frac{3}{4}$ pay after 35 years' service and all officers at 64 years of age on $\frac{3}{4}$ pay.

In order to pass such a measure the retired list must be made popular. This would not be as difficult as might appear at first thought. I have never been able to understand why a retired officer should not render such service as he is capable of performing and earn, at least in a measure, what the Government pays him. A few perhaps do, but the great majority do not. Many have made fortunes and nearly all have made the efforts of their lives after retirement. Their pursuits range from trading, money-lending, insurance, real estate, railroading and banking to fox-hunting, all of which are followed, often with an activity, zeal and energy, which, if displayed in the line of duty, would be a credit to anyone, and of which, at least a portion, might be employed to the advantage of the service and of the country at large. Suppose the system of retirement just advocated be adopted in addition to retirement for disability. All the details at colleges and with the National Guard could be

filled from the retired list. The colleges would make up the difference between half and full pay. Some might adopt civil pursuits and be given duty in connection with the National Guard or public schools in the communities in which they had settled. In fact, I am not sure but that nearly every detail taking officers away from their troops, except staff duty, might to advantage be filled from such a retired list; for the mere fact that chance does not bring timely promotion to an officer, does not render him less strong, active, intelligent or efficient.

In the event of war he could be placed again on the active list, perhaps with increased rank—in case of retirement for disability it could be determined at the time what duty if any he was capable of performing without injury to his health, and when given duty requiring his undivided effort, he could be given full pay. All these, however, are mere matters of detail, the important point being to give useful professional employment to officers on the retired list, in order that they may be something more than mere drones and demonstrate to the people of the country the advantage and utility of having such a number of educated professional soldiers distributed among them; while the young officer, entering the service with increased prospects of more rank and greater emoluments, would find a sufficient stimulus to his interest, in the increasing importance and scope of his legitimate duties.

The personnel of any concern, if considered intelligently, must be considered in relation to what it has to do. What is required in our service of the non-commissioned officer, can in a measure be determined by reference to our drill regulations. Take for instance, "The Troop" in "Extended order." Any one who has had the experience appreciates the complications in those exercises, and will no doubt agree that commanding a troop at squadron drill in close order would be an easier task than commanding a squad at troop drill in extended order. Nevertheless, the present regulations might be practicable with the best of well trained and experienced non-commissioned officers, but not otherwise; for readiness in giving the proper commands in all sorts of complicated and exciting situations, cannot be acquired by study of tactics alone, or by a mere effort of memory, but must be the result of long and continued practice,

until a habit is established similar to that which enables a fluent speaker to utter his thoughts without an effort of memory to bring up the words to properly express them. The class of men that can be secured for the service and retained in it, depends largely upon what a man who enlists may aspire to; for the best of men in any calling have aspirations and the best men are the ones most needed. The chance of getting a commission counts for little, at least so far as the cavalry is concerned. What is needed are men who will make first-class non-commissioned officers, and who are willing to remain as such, and in order to get them and keep them after they are caught, the positions must carry with them emoluments and privileges to which such men will aspire. The conditions of our service demand more pay and greater privileges to non-commissioned officers.

The average soldier will know his drill regulations and manuals better at the end of his first enlistment than he will at the end of his second. After the novelty dies out and the ambition or curiosity or whatever it may be, to know something about his calling has subsided, he seems to exert his utmost endeavor to know as little as it is possible to know and get along. He seems, in fact, only capable of taking on a certain degree of polish, and any effort beyond that can only be bestowed by way of repair. Nearly every old soldier has a way of his own which he prefers to that laid down in the tactics or regulations, even to the way of challenging when a sentinel on post; it seems better suited to the workings of his mind. But when it comes to field service, and the doing of things which every one must figure out more or less for himself, in which tactical precision is neither required nor expected and where experience alone is the teacher, the old soldier, if he is of any account at all, appears greatly to his advantage in contrast with the young one. He has learned for once and for all to do these things and no tactics nor regulations can change them or interfere with his peace of mind; and so, instead of wasting his time trying to unlearn them in order to be able to learn them some other way, he simply goes ahead and experience constantly teaches him something new. So that while instructing and drilling him may often be up hill work, there are points about

the old soldier as we find him on the average, that are worthy of preservation and note.

As a subject for instruction however the young man is far more satisfactory. A good honest effort to teach him his duties and his trade almost invariably meets with gratifying results. If an officer with such material should not be satisfied with his command, he would do well to scrutinize his own methods and redouble his efforts, for his command will in the end be exactly what he makes it. It may not always become the finished article, but it ought to be better, not worse, than the raw material.

With a small standing army like our own perhaps the most useful function it can perform in times of peace, is to educate young men, not so much with a view to their becoming professional soldiers, as to their becoming citizens with sufficient military training to be able to take the field in times of war, or in times of peace to make themselves useful in the militia. The tendency at present seems to be in this direction and I believe the principle could, with considerable advantage to the country and to the service, be extended in its operation to the commissioned officers.

THE TURKISH SOLDIER.

(FROM THE GERMAN.)

BY CAPT. JOHN P. WISSER, SEVENTH U. S. ARTILLERY.

IN general, religious fanaticism is regarded as the mainspring of action in the Turkish soldier. In his every-day life, however, there are no indications of fanaticism, while, on the contrary, there is very often evidence of a far-reaching tolerance. Exclusive of distant mountain districts, the followers of different confessions until quite recently lived peaceably together, without interfering with each other in the exercise of religious worship. The Turkish people look with the curiosity they would show at a play, upon the processions and similar church solemnities in Constantinople, astonished at their splendor, so foreign to their own simple forms of service, but without any hatred or malice. Turkish bands accompany such ceremonies, as well as Christian funerals, without the least objection, and during my long sojourn in the East I cannot recall a single instance where Mahommedans disturbed the religious exercises of other faiths. Such disturbances have been reported from Macedonia, Kurdistan, etc., it is true, but they were exceptions. Indeed, up to the year just passed, the Greeks were even permitted to discharge fire-arms in the streets during their Easter festival, while the Turkish soldier is not even allowed to use his gun for regular practice.

Our authority on the Turko-Russian War also tells us that "As a rule Turkish fanaticism to-day is confined to words; indeed, no Osmanli will be likely to surpass a European. On the contrary, the Musselman has become tolerant; he lets every one believe what he pleases; every subject tribe has preserved its manners, customs and religion. That is why the Ottoman Empire is not a homogeneous whole; the Bulgarian has remained Bulgarian, dreams of his ancient Czar glory, and hopes that in place of the half-moon the Bulgarian cross will in due time look down from the Aja Sofia in Stamboul on a new Bulgarian empire; the Armenian counts on a

new empire of Asia Minor under his dominion; the Ottoman Greek sees the empire of Alexander the Great arise once more; in short, Wallachians, Servians, Kurds, Circassians, Bosnians, Tunisians, Egyptians, Tripolitans, Arabians—each and all dream of a kingdom of their own.

“‘For Islam religious freedom was a death stroke.’”

In regard to the concluding sentence opinions will probably differ; but this is not the place to discuss that. We simply call attention to the fact that this observer, like others, did not notice any expressions of religious fanaticism, not even during the excitement of campaign life. Similar reports come from Thessaly to-day.

The late atrocities in Anatolia appear to contradict this. But on closer examination it will be seen at once that even in this case the true cause is to be found in political motives and a systematically planned and prepared course of action, for which only a limited number of participants, not the mass of the people, and especially not the educated people, will be held to a fearful accountability. Of a spontaneous uprising due to religious fanaticism there was, at least according to the majority of the witnesses, no question at all, and even less was there question of a long-repressed race hatred.

Religion plays, it is true, an important part in the daily life of the Turkish soldier; it serves as a means of training and as a cement for discipline; for, five times daily are the troops assembled in the *Djami*,* and absence from prayer, at least in the military schools, is punished far more severely than absence from duty, or overstaying leave of absence. The influence of religious customs is everywhere apparent, but this is still far removed from fanaticism. I cannot admit that the latter has first place in the forces which influence the army. That should rather be given to pride of race, which is not wanting even in the lowest Moslem. The tradition of conquest, in spite of the defeats of recent times, still lives in the whole Turkish nation. Even the most insignificant individual feels that he is a member of a ruling race in the midst of the common herd, and considers himself far above the latter. Field Marshal Moltke truly says:

* *Djami*—place of assembly, Moshee.

"A Turk unhesitatingly acknowledges that the Europeans are superior to his nation in learning, art, wealth, enterprise and energy, but it would never occur to him that on that account a Christian can be the equal of a Moslem."

Such a feeling, which often ripens into the political error of arbitrariness, is most useful to the soldier. The belief that he is and represents something special develops in him the sense that he is bound to accomplish something beyond the ordinary. A narrow objective term of mental feeling gives birth to no great deeds. Instruction and military training are also greatly promoted by the manner of bringing up the children. The very uniformity in the character of the latter is of use. The child of the poor peasant or shepherd is held to exactly the same rules of conduct as that of the gentleman. It learns the same greeting, the same modes of address, the same answers to conventional questions, and the same manners, such as rising in the presence of parents, waiting to be asked to take part in a conversation, and firm self-control. Proper regard for age and authority, and submission to the will of the powerful and superior, without thereby losing a certain feeling of social equality, have their share in uniting the masses. This process is promoted by a natural tendency to take up an isolated position in the midst of the surrounding peoples.

The Turk cannot long endure to live under foreign rule in a foreign land; he is forcibly drawn back to his own countrymen and his own people. Lost provinces are gradually deserted by the Mahomedans, notwithstanding that they may be better off under the new conditions than they were before. The Russian government is the only one that has thus far uniformly succeeded in reconciling its newly acquired Mahomedan subjects to the altered conditions and binding them to the soil. Recently Austria succeeded in doing the same in Bosnia.

There remains to be considered the enormous power exerted by the name of Padishah on the minds of the people, irrespective of the fact whether the ruler is a well-beloved prince or not. His orders are for the Believer, law, and fate. He looks upon them as something unalterable, a power which there is no resisting. When once the Sultan has expressed his views on any subject, discussion is closed; his guardianship reaches even into

the private life of the individual, and affects the smallest matters. Closely interwoven with the virtue of self-control, so highly prized by the Moslem, is resignation to Fate, the ready recognition of that which is meted out to each and every one by Divine Dispensation — "Kismet."

To all this must be added the sobriety of the Turkish soldiers and their contentment. Drunkenness is an unknown vice among the young people. Fondness for pleasure does not, as in the west of Europe, unnerve them early in life. The pressure of want, which bears so heavily on the people of the over-populous west, and makes them old and weak before their time, is absent. The man is not prematurely bent by his work, as in our manufacturing towns; he is fit for service to a much greater age. Farmers, shepherds and hunters constitute the mass of recruits for the army, even laborers form an insignificant part. Most of the men have been familiar with arms from their youth; and they have learned camp-life in their wanderings and journeys. Hence, there is not much left to be done in the training of the troops to render the new recruit available for the ranks, and for that reason the Turkish commander never hesitates to assign recruits directly even to an army in the field. The little required of them in a technical way is soon learned from their older comrades.

Routine duty in the army is generally well performed and in an orderly manner. Even small subdivisions are always under some one's command. Quietly and without much bustle the daily tasks are performed. Police and guard duty constitute the principal part; the reception of the daily rations, the fetching of water and various other kinds of work fill the rest of the time. Drill takes place usually twice a day, in the morning and towards sunset — strictly according to the regulations and punctually on time. The strict punctuality to which we are accustomed, as well as the constant strain which we require, are both wanting. But discipline and willingness are abundantly present; and excesses are of very rare occurrence. Of course, the obedience is only passive.

The trained energy, which induces men, in spite of the greatest difficulties, to make every possible effort to carry out an order, is absent. The soldier is very apt to accept an unex-

pected obstacle as the will of Fate, and so gives up trying to overcome it. Oriental indifference comes into play here; it consoles itself very quickly over a failure. But, on the other hand, willingness and fearlessness are at the service of an energetic leader. For example, I found the young men of the military school at all times ready to go on long rides or marches, and to take part in exercises which lasted from early morning till sunset, although entirely unused to such exertion. As with all strong native races, courage and contempt for death are highly rated, although they are not much talked about. They are taken for granted by every one. In this religious views show their influence. The Mahommedan does not mourn loudly and long for the dead; to him death is not very horrible; and he always keeps in mind the natural, unalterable character of this occurrence. His composure and bearing under misfortune are worthy of imitation. "God preserve you from greater misfortune" says the Moslem to his friend, whom Fate has dealt a severe blow. The soldier who falls in battle is regarded as blessed, since all the pleasures of Paradise are his.

Consequently, the Turkish soldier never loses his composure in presence of a great danger, or under the feeling that the enemy is greatly superior, or with almost certain defeat, according to all indications, confronting him. This fits him for great deeds, especially in defense, where activity is less required than tenacity and endurance. Aside from the well-known deeds of heroism in the siege of Plevna, the battle of Lofdscha has always appeared to me as exhibiting most highly this particular quality of the Turkish army. General Strecker has described it in an excellent article. Eight weak *Landwehr* battalions with a single battery, hardly 4000 men in all, resisted for an entire day the united corps of Imeritinski and Skobelev, which, with a superiority in men of over six to one, had not less than 96 guns, most of which were brought into action. When, finally, retreat was unavoidable, the wounded and those incapable of marching held the last point of support of the position to the very end, and, declining to surrender, fell one and all on the field of honor. Mouzaffer Pasha's book on Plevna says with truth: "The defenders of Lofdscha showed as much gallantry as energy; their commandant, Rifaat Pasha, to whose valor even his adversaries

bear testimony, resisted the Russians with an energy all the more remarkable in that his infantry was only one-tenth as numerous, his artillery only one-twelfth as strong as theirs." Among the troops were several battalions of *Landwehr* of the third ban.

The Turkish soldier has been unjustly regarded as lacking the spirit of the offensive, and has been considered useful only on the defensive. But this is not borne out by the movements in the battles around Plevna, if they are carefully investigated. The capture of the redoubts 18 and 19, on the south side, on the 12th of September, 1877, militates against this view. The fact that the larger bodies of the army did not show themselves fit for offensive movements was due to other circumstances than the lack of necessary qualities in the soldiers. Of this we will speak later.

Meanwhile, we may rest assured that the human material of the Turkish army, as regards its natural qualities, will meet the highest demands that may be made on it. From soldiers in whose nature lies a willingness so inexhaustible and fearless, not to mention their resignation or sacrifices, and who are also in excellent physical condition, and, by daily exercise inured to campaigning, the very highest can undoubtedly be expected, provided only that they are properly led. Under these circumstances the result will depend, even more than usual, on the intrinsic worth of the officers.

Reprints and Translations.

GENERAL RECONNAISSANCES: THEIR OBJECTS AND VALUE, ETC.; TOGETHER WITH PERSONAL EXPERIENCES PUT FORWARD TO GUIDE THOSE ABOUT TO START ON THEM.

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IT has been said, "That man succeeds in life who is best informed"; that that nation succeeds in war which has the best information is an axiom deduced from history, the truth of which cannot be gainsaid.

That a peaceful and commerce-loving nation, whose wide stretching and scattered territories are hemmed in by neighbors, ambitious and unscrupulous, ignorant and arrogant, savage and warlike, should in times of peace seek to gain a knowledge of their respective countries and resources in the interests of peace, progress, and commerce, may at first sight seem an endeavor irreconcilably inconsistent with its aim; yet its inconsistency vanishes, and its true purpose alone stands out in bold relief, when it is considered that the best criterion of peace is to know where and how to strike with effect, and how best to defend one's own; how to coerce and paralyze, as far as possible, with one blow, and to proportion the energy put forth to attain the object desired, so as to minimize the consequences of the disturbance of equilibrium which must arise, and by so doing to economize the force to be kept ready for its restoration; and when it is also borne in mind that the road of progress leads over the dead ashes of man's animal nature and of the pleasures of an untrammelled life, which those who enjoy will only give up by force and not by example.

Great Britain of all nations can least afford to neglect to make use of the strength to be derived from this knowledge of countries and peoples, she being a nation ruling an empire encircling the globe and one whose frontiers touch those of almost every nation and people of the earth, some of whom are as highly civilized as herself, others but emerging from the savage state of life, the majority representing every round in the ladder of progress lying between the above extremes.

Such an empire is of necessity made up of a heterogeneous combination of territories and of the peoples inhabiting them, whom it is possible to incorporate into it to form one of its constituent classes: its lower or

laboring class, its middle or trafficking class, and, to a certain degree, its military and upper or ruling classes.

To a nation ruling such an empire the knowledge of its own constituent parts, and of the countries and peoples surrounding them, is an element of its strength and of its greatest power; indeed it is of the utmost national importance, when it is considered that they may become centres of revolt, theatres of war, or centres of commerce and of supply, both of personnel and matériel, for our own armies; considerations of moment, whether we consider ourselves as likely to be engaged as pacifiers, as enemies, or as allies. (See Concluding Remarks.)

Thus it is that surrounding and being surrounded by such varied elements, perhaps of prosperity, perhaps of strife and instability, friends or enemies of peace, commerce, progress, and civilization, in the interests of humanity, it is essential that the rulers of our empire should have a full knowledge of the countries within her borders and bordering her, a knowledge to be gained by reconnaissances of the scope and nature to be hereafter touched upon.

2. The main military objects of such reconnaissances are:—

a. The formation of correct judgments.

b. The acquirement of the knowledge of the forces to be overcome, and how to attain the end desired with the greatest economy of power.

3. It is an established fact that the results of war are never absolute. This is the natural consequence of the imperfect natures of its agents, viz., man and the animal creation that he calls to his aid. The great wear and tear of a campaign, its concomitant losses, sicknesses, anxieties, fatigues, etc., prevent the realization of the ultimate aim of all war—the conquering the military force of a nation, *i. e.*, the country and the will of the people, and limit its object to the occupation of only so much territory, and the subjugation of his will only to the extent necessary to force him to yield the object for the attainment of which force was set in motion.

This knowledge of the force to be overcome and of the force necessary to overcome it, are to be arrived at by a perfect appreciation of circumstances that may be expected to arise, and by a comparative and just estimate of the moral and physical forces, the strategical talents and tactical organizations to be encountered, with reference to these forces, talents, and organizations as they exist in our own nation.

A knowledge of the above will enable plans to be elaborated and the resisting forces to be weighed and appraised at their proper value.

Thus only is it that correct judgments can be formed and the elements of chance to a great extent eliminated, and results predetermined with an amount of certainty unattainable by any other means.

The light also thus thrown upon the power of a neighbor to cope with our own preparedness is an essential requirement of strategy; deprived of it any step taken must be a step taken in the dark, full of danger perhaps, by chance only the right one.

The success therefore of a military venture will be the greater or less as its various steps are traced beforehand, and all available force simultaneously applied to its attainment; the more this force is compressed into one act, and the duration of its action into one moment of time, the better.

This economical application of power, the simultaneous application of a force sufficient to attain the end desired, is also to be deduced from the results of general reconnaissances, and is one of their main objects.

4. War has been aptly likened to a slow disturbance of equilibrium, a weary wearing away of force, the lasting powers of which can be nicely calculated when the conclusions drawn from former experiences are made use of. Given the living agents, all military operations hinge upon time and distance, factors largely influenced by a multitude of considerations, to be prepared to meet which beforehand is to be forearmed, to leave which to chance is to trust to a fatalism scornfully ironical and proverbially antagonistic to those who neglect to help themselves.

Some of the most important of these considerations influencing the course of a campaign from its inception, through its various stages, to its termination, will now be cursorily reviewed.

Tactics is the science of the use of military force in combat; a use greatly influenced by knowledge of the nature of the ground to be fought over.

Strategy is the theory of the use of combats for the objects of the war; to work out its problems intelligently an intimate acquaintance with the moral and physical forces of the armies operating within its theatre, as well with the topographical features of the ground itself and the communications traversing it, is necessary. Its essence consists in the arrangement of separate marches in view to well-timed concentration and the occupation of important points, now more difficult to attain to than in former years, because the size of armies and the numerous roads which traverse cultivated countries often cause the strongest positions to lose their value.

The dispositions for the march, its precision, the extent to which its frictions can be lessened on the road by suitable camps, bivouacs, requisitioning (food, transport, etc.), cantoning, depots to be formed, bases to be used, lines of communication to be adopted, season of the year to be chosen for operations, etc., all essentials to conservation of power and therefore to success, are capable of being reviewed and reported upon.

The lines of communication are so sensitive that a wrong choice cannot be rectified and may cripple the campaign or render it wholly abortive; whilst a strong, well-selected line will cause the enemy's movements to conform to your initiative. The best lines, even if the longest, will generally run through the most important provinces and the most flourishing towns. Main communications are most appropriately used for strategic purposes and not by-ways.

The large towns of a district give the greatest assistance to an army—shelter for troops, safe storage for provisions and war materials; their civil workshops, and tradesmen, etc., are of value; military establishments of many sorts are to be found in them; they are in fact essential to the organization, administration, and maintenance of an army.

Military bases depend for their fitness upon sources of supply and refitment, fortresses to store munitions of war, open towns for storage of provisions, etc.

All ground influences the course of the battle, the preparation for it, the use to be made of it. It is an obstacle to view, or the reverse; it renders war complicated, diversified, and scientific; its influences are never in abeyance.

Uncivilized nations are incapable of possessing the highest military virtues; enthusiasm and fanaticism will in part supply their places. National armies, raised to meet an emergency, and insurgent levies are destitute of the virtues indispensable to a united body; guerrillas fight best scattered, and choose a difficult and intersected country. Tribal levies, half-trained Oriental troops, and trained military bodies must be met differently. The more intelligence and a war-like spirit are wanting, the more an army will avoid difficult ground and dispersion and carry out a principle of concentration. A distinction is here made between the war-like and the military spirit. Tribal levies will possibly possess the former; trained bodies may possess both, or the war-like spirit may be wanting.

Ground regulates the relative proportions of the four arms; command of ground has in war a charm peculiar to itself; it gives command of view, a more easy application of force, a sense of superiority unwarranted by the truth.

The connection of ground with a defensive position is a double one—strategical and tactical. Strategical as regards its influence on the course of the campaign and defense of the country; tactical as multiplying force by adapting its defensive characteristics to the requirements of the several arms.

Mountain ranges and hilly country introduce into war a retarding principle on account of the difficulties of marching, transport, provisioning, etc.; they act as barriers, limit view and movements, shelter irregular troops, etc.

Rivers influence operations as barriers with certain points of passage only; they influence provisioning, lines of communication, etc. They require the assailant to act concentrated, and expose him to dangers.

Forests are of value both strategically and tactically. In rear of a defensive position, they enable the defender to see clearly and to develop his plans later than the assailant. They assist in giving cover and facilitate a retreat.

The above considerations will suffice to indicate to what a great

extent the course of a campaign is influenced from its very conception and initiation, through its various phases, to its end, by the physical features of the country to be operated in, the position of its centres of supply, the direction of its main lines of communication, the character of its inhabitants, etc. To enter on a campaign without having considered such influences would be for a commander to betray the high trust committed to him should the means and the instruments necessary to their consideration have been placed within his reach and he have neglected to employ them.

Although it is necessary that a commander should appreciate the true value of accidents of ground, yet the dangerous attraction of localities must at times be avoided, and the principles guiding the dispositions of troops must often ignore them; the plan of operations must seek primarily to conduct armies so as to insure concentration, and to give them a fair field of action; the training of the troops must carry out the rest. These considerations, together with those given above, must be equally weighed in the balance. A just determination will be found to lie between the extremes of seeking to fight on ground well known, and refusing the combat on any other, and that of accepting battle on haphazard ground, *i. e.*, between the ideal of caution and full preparation to meet all emergencies, and that of a determined and resolute forward movement trusting alone to organization, skill, and the first direction given to the heads of columns to work out a success. A commander should therefore ever bear in mind the value of the knowledge of country and people in the business of war, and lose no opportunity of turning its acquisition to his advantage by seeking to gain it by general and special reconnaissances.

GENERAL AND SPECIAL RECONNAISSANCES.

5. Reconnaissances may be classed as general and special; the former carried out in detail in time of peace, are intended to procure the most accurate information concerning countries that are likely to become theatres of war or centres of supply for our own armies, as well as concerning foreign armies and their war establishments.

It is to the consideration of general reconnaissances alone that this paper is limited. Special reconnaissances are treated of in all military manuals; not so general reconnaissances. Before the latter can be attempted an officer must be thoroughly trained in "special reconnaissances." (See para. 10.)

6. General reconnaissances therefore must consider our own as well as foreign countries. One of their primary objects is to procure the necessary data, in the first instance, for political and military study, and secondly, for drawing up plans of operations, especially in so far as the first concentration and movements of an army are concerned. Inasmuch as the possession of a certain tract of country can never of itself act decisively, their scope becomes widened, and their attention turned

to the living forces moving over the tract, which must always be of the greater importance.

The national character as well as the characters of the ruler and administrators for the time being are important points in determining the military value of a people.

In spite of taking and keeping the initiative, the means most conducive to enable a general to select his own fields of action and to obtain thereby all its concomitant advantages, he may be drawn by the operations of the enemy into positions and directions never foreseen, as well as into tracts of country, the peculiar topography of which may be unfavorable from more than one point of view.

That country is favorably adapted to the carrying on of military operations which is favorable to the movements, fighting, and subsistence of troops.

7. These main considerations influence the direction given to a general reconnaissance, and should be chiefly considered in drawing up its report; observations on the means of defense or lines of offense bearing in preference on the obstacles and military positions, etc., which lie along the principal lines of communications; those on which natural and general advantages are so combined as to form of themselves, or in conjunction with artificial obstacles, a good line of defensive or offensive operations, being primarily considered.

A general opinion, giving a clear, general exposition of this nature, drawing special attention to the most important points, which may then be studied in detail, is to be preferred to a voluminous memoir considering every conceivable kind of position under every possible strategical combination. For purposes of perspicuity, therefore, reports should be drawn up in general and in detail. General reconnaissances must, consequently, be simple as regards their object, and thorough on the points concerning which information is desired.

These reports are sensibly facilitated by the number and quality of modern maps and works on geography, general history, inclusive of the newspaper history and records of the events of the day, military history, memoirs, regimental records, etc., *i. e.*, by works of travel, history, and military literature generally. The sketches and reports of sportsmen and travelers are often of great value.

From these sources of knowledge the military information required has to be deduced and brought out in relief. In this respect tables of statistics are of great value, giving information concerning the population, head of cattle, cultivation, manufactures, etc., of a country, in a form at once practically useful. Reports made by governments on the progress of public works, budget estimates, law reforms, commercial reports, etc., contain military information of a very valuable nature.

8. In systematically carrying out general reconnaissances, and, especially when examining countries likely, from political reasons, to become theatres of war, care should be taken primarily to acquire the

information which may be wanting concerning the military geography and military statistics of the country in question, and to bring the information already acquired (especially maps) up to date.

Journeys undertaken for these purposes, the necessary preparatory special study and the reports made as the result of observation taken are moreover, the means of training officers entrusted with such like missions; the importance of this training should not be underrated.

9. In general reconnaissances the most accurate knowledge of the country to be reconnoitred that can be acquired beforehand from materials existing is, therefore, of essential value. We avoid thus losing time in acquiring what is already known. What is required is new information, or at any rate, what is old brought up to date. The military history of a country is of great value towards giving hints as to the course of action to be pursued under varied circumstances. Many conditions of making war remain constant, and the truism that history repeats itself is not to be lightly disregarded.

10. The information gained by general reconnaissances requires to be supplemented by military reconnaissances of a special nature, the necessity of which will perhaps alone become apparent after the former has been carried out and its results studied. From them an opinion founded on observations actually made on the spot, and with a view to either the actual military situation at the time, or to a supposititious situation, is what is in most cases required, the facts and information on which the opinion is founded being given. Much of this special knowledge can be abstracted from general reconnaissances.

General reconnaissances approach to the character of special reconnaissances when carried out under some special supposition, such as, "offensive or defensive operations," "concentration of troops," "march of an army in a given direction with a definite object." Practically, this generally takes place after the plans of the first military operations to be undertaken have been decided upon and mobilization is about to be ordered.

The information gained by special reconnaissances, drawn up by numerous individuals even though trained after various methods and to different degrees of excellence, trivial and unimportant though they may seem, yet when systematically collated and combined, goes far towards the formation of a homogeneous whole, if each reconnoitrer has clearly and faithfully recorded what he has seen and heard whilst reconnoitring.

A methodical training in military academies in special reconnaissances is of more than ordinary importance. The words or map of a reconnoitrer must convey to the reader of them the impression intended. One man must not call, or represent, a mountain a hill, and another must not describe an undulating as a hilly country, a wood as a forest, or a dwarf tree as one giving timber. Climatic terms; hot, cold, etc., must not be loosely used.

11. The qualities of body and mind essential to a reconnoitrer are

endurance, a good eye for country, an accurate judgment, and a quick perception—qualities possessed by most men to a greater or less degree; by all capable of being cultivated and widely developed by practice. These natural gifts, when properly trained, go far towards fitting the special reconnoitrer to carry out a general reconnaissance.

12. The first and foremost knowledge requisite for the carrying out effectually of a general reconnaissance is the most thorough general knowledge of the military sciences and details of military life, without which the conditions of the movements, fighting, and subsistence of troops cannot be thoroughly understood. By a trained observation, by study and practice, the reconnoitrer will be enabled to grasp instinctively the points on which, both as regards the people and the ground, it is desired to obtain information; its result is a sound military judgment.

13. As home defense is to a nation of first importance, the great part that the general reconnoitrer should be called upon to play when considering it will now be considered. The foregoing remarks on the value of general reconnaissances refer equally to home and to foreign countries; those that follow apply chiefly to the home country, colony, or dependency, and home defenses, and will endeavor to indicate the value of such home reconnaissances and the objects to the attainment of which they may be most profitably directed, *i. e.*, to the defense of the country and the selection in times of peace of points to be fortified, communications to be improved and opened out, war establishments and mobilization centres and supply depots to be planned, etc.

Nations and peoples are often called upon to make large sacrifices to gain even a sense of security. The reality of true security to be gained by forethought at a comparatively infinitesimal cost is too often neglected, and a lavishly costly expedient, indifferently able to supply its place, adopted in the end; the old adage "Penny wise and pound foolish" does not hold in cases of national moment, for in addition to the pound sterling is the loss of prestige and self-respect, beyond the price that gold can pay for.

14. All warfare, whether in our own or foreign countries, must be preceded by preparation for it. This includes besides the organization of armies and munitions of war, the preparation of the country itself for carrying on war advantageously by the construction or planning of the necessary buildings for the purpose—not only military establishments, but also communications and fortresses.

Improved means of locomotion, by rail, road, and water, serve continually to diversify strategical considerations. Numerous roads intersecting a country are in every way favorable to military operations, especially is a good longitudinal frontier communication essential to an economy of force and to its security.

Railroads are of higher importance than roads and river communications, in a military point of view, for certain periods of a campaign, and

in certain directions, *i. e.*, for concentration, rapid movements from one theatre of operations to another, all movements from front to rear and *vice versa*; the evacuation and provisioning of an army. Railway communication is rapid, continuous, and economical. Nearer the enemy, roads are of the greater importance.

Every new line of railway adds a fresh element of strength to a system of national defense, and with the efficiency of each separate line of railway the military strength of the country increases, for they serve to control both time and distance and commercial, industrial, and agricultural enterprise follow in their wake (para. 4). In their conception therefore, a far-seeing policy must ignore a short-sighted economy. They are great civilizing influences.

Railways thus exercise commercial, military, and political influences of the highest importance and are essential to the development of semi-civilized lands and peoples. Our colonies have largely availed themselves of them to the increase of their strength and wealth. Had China run her railways to her frontier to meet those of Russia she would not now be in her present parlous state, and had India done the same westwards and northwards from Quetta and the Persian Gulf respectively she would have saved herself much anxiety. General reconnaissances should have brought out these wants in bold relief. (See Concluding Remarks.)

Improved communications also render necessary a change of political frontiers and a reconstruction of administrative limits; the establishment of our empire in India and that of Russia in Central Asia exemplify these points. These necessary adaptations are, or ought to be, ever progressive. We are slow to acknowledge their necessity. Russia gives a notable example of a far-seeing administration, pushing pioneer-railways to gain future advantages; and India an equally notable one of their neglect, even when necessary to the development of outlying provinces. (See Concluding Remarks.) Russia has several times within the past few years re-arranged the Governments-General of Central Asia to meet the requirements of military bases of operations against Turkey and Persia, Afghanistan and India, and China. Their object is to have each base a distinct civil and military unit under one undivided control. Her re-arrangements are never in abeyance.

15. Fortresses, if well placed must determine both the line of advance of an invader and the course of the defense of which they form the *points d'appui*; being immobile and bound to the spot where constructed, the selection of their sites becomes a matter of national importance and only to be reasonably decided upon when, and in so far as, one is in a position to determine how they will answer the purposes of war. The possibility of thus determining depends primarily on the permanent nature of the geography of countries; but cultivation, communications, resources of the neighborhood, home politics and relations with other countries, and political boundaries must also be considered.

It is only on a foundation of so universal, geographical, and political a character, that places can be decided to be worthy of fortifications—as being of importance in politics and in strategy, not for small objects, and not merely suited for the purposes of one war, but for those of all possible wars in the locality in question.

The importance of these places must also be supposed to be permanent, or to be of long duration.

16. The most secure basis for the choice of such points, to secure the best possible use of the ground fortified, rests on the geographical configuration of the country, for it regulates :—

a. The sites of the great centres of habitation, *i. e.*, cities.

b. The systems of communication between them.

Both are aids by which war must be carried on, and their possession is consequently essential.

The large towns of a district give the greatest assistance to an army (see para. 4); they are centres of provisioning, billeting, organization, and of communications.

The home army must secure to itself intercommunication between such places by holding those points which are essential to free movements; such points, in the system of communications, are those the occupation of which would influence their use for considerable distances, *i. e.*, passes, defiles, etc. The most important of these are those which present the greatest natural obstacles, which are most difficult to turn, and toward which the greatest number of communications converge; such are generally found at important river crossings. These are also important as junctions of communications, as centres for concentration of troops, and for bases of operations; they enable armies to act in many different directions.

Hence to prevent the frittering away of the army, these essential points must be held by the minimum of troops. The means to this end is their secure occupation, *i. e.*, their fortification in time of peace, or at least the planning and laying out of the works, and the collections of the necessary material for their construction.

17. A general reconnaissance of the Punjab, on the principles already enumerated, is most desirable. It is one worthy of the close study and attention of the military student. Here the necessary preliminary study insisted upon as essential to the success of a general reconnaissance, would not only require that the reconnoitrer should traverse the length and breadth of the Punjab with all available topographical information in his possession, but that he, as well, should have thoroughly mastered several of Napoleon's campaigns in Europe, more especially that of 1814, exemplifying the bearings of rivers and river crossings on the strategy of a campaign.

The selection of the site for a bridge across a wide river is as much a question for the soldier as for the engineer. Such a site has a tactical and strategical value as well as a commercial one. The same remarks

apply to the alignment of many lines of road and railway. Such considerations are best committed to soldiers, and all frontier communications should be under them.

Such localities are therefore to be chosen, as above suggested, with reference to the organizing and maintaining of armies and navies, to serve as entrenched camps, war harbors, arsenals, manufactories of war material, war dock-yards; as magazines and depots for safe storage of war materials, etc.; as well as with reference to the movements of armies and navies, both to serve as barriers, and as means of securing a free passage in the presence of an enemy.

18. In all cases, view must be had to the possibility of conforming the ground to the uses of the home army, and to render it eminently unsuited to those of the enemy, *i. e.*, it must be chosen with reference to its object as an *enceinte de sûreté*, as well as on account of affording a favorable battle-field.

If the importance of the place, whether in any particular theatre of war or for the whole country, be so great that possibly the result of the campaign or of the whole war may depend on its possession, its importance causes it to be viewed with reference to its capability of becoming an entrenched position, where the struggle will be directed against the person of the enemy and the overthrowing of his army, the place itself being held as a means towards the attainment of the above ends. Antwerp is a good illustration of a place entrenched with the above object in view.

Such a selection of ground and the adaptation of works to it, by reason of the suitability of its natural features aided by art, and of its geographical situation, will prepare a battle-field in the highest degree favorable for the decisive battle of a campaign, to an army unable by reason of small numbers to take the field in unprepared positions.

19. A ground thus favorable is conceivable, without the kernel of a fortified place, somewhere in a part of the country where topographical peculiarities afford special tactical advantages, and where the locality is strategically suited for a decisive battle; but it will be generally found that these localities, because of their inherent advantages, have from early times been secured as fortified places, and hence it is that such favorable situations are generally found to have a fortified post as a kernel. This point may be illustrated by a reference to Kandahar; the mere fact of Kandahar being to-day a large town and of its having been such far back in historic times, points to its importance as a centre of commerce and communications; that it is also a fortified town, of a strength beyond that of other towns in the same neighborhood, serves but to doubly certify to its military importance and to indicate it as also occupying a site of strategical importance considered relatively with the existing systems of communications. (See para. 14.) The same arguments apply to Kabul, Herat, etc.

20. It can never be possible to furnish the theatres of all possible

wars with permanent fortifications, which will suit every requirement that may be expected to arise; the interests of civil life, considerations, technical and economical, prohibit this; want of time and money and political grounds may render it impossible even that such should be commenced.

Indeed, it will be impossible to force upon the consideration of the authorities, until emergency and the pressure of circumstances make their want stand out clearly, the importance of certain points. Hence arises the value of stable deductions to be drawn from a general view of the topography, history, etc., of a State, *i. e.*, the selection of such localities in time of peace, the recognition of their importance and the preparation of plans for seizing, holding, and provisioning them.

A well-conceived reconnaissance will not only draw attention to the keys of the country, as indicated above, but also to the numerous transformations of the existing condition of its theatre, by constructions and demolitions, which must take place in the closest possible connection with the military operations; and, by noting the previous preparation of materials and workmen, etc., required, will enable the best uses to be made of whatever exists on the spot, and thus obviate waste of transport and time.

21. The considerations given will, it is hoped, serve to indicate the value of general reconnaissances, their wide scope, and the study, preparation and training required by an officer ambitious to carry one out. The opinions are chiefly those of the military writers of the day who have given their attention to the subject.

Let us now consider the actual field work necessary to their execution.

22. The training of an officer in reconnaissance duties received by him in the military schools and colleges, or what may be called the training of a special reconnoitrer, will be of the utmost use to him as a general reconnoitrer, if he has mastered their minutiae and yet does not allow himself to be trammelled by them.

The data of the problem he has now to solve have changed, and it is his object to gain all the military, commercial, and topographical information he can with the greatest accuracy obtainable, and very possibly without drawing attention to his movements, and in the least possible time. The more skilled the reconnoitrer is in the use of compass, sextant, plane-table, theodolite and level, the better will be the results of his rapid work.

Whilst driving, riding, or sailing, according to the circumstances of the case, selecting that mode of travelling most convenient to himself or dictated by the nature of the country to be traversed, accompanied, perhaps, by an escort or guide, he must at a glance be able to note features of ground, positions of strength, nature and methods of cultivation, distances, heights, slopes, etc., *i. e.*, as many of the minutiae required to be reported upon when carrying out special reconnaissances of country,

communications, defiles, mountain districts, etc., as possible. He must carry in his eye standard measurements of distance, height, slope, etc., and be able to judge them with accuracy and note them down quickly, perhaps without drawing rein, and always without attracting greater attention than that which must of necessity be drawn by every traveller out of his own country.

The topographical reports of a geologist are generally better and more instructive than those of others. There is a connection between the occupiers of a soil and its nature which determines their mode of life as settled agriculturists, as nomads, etc.

With a knowledge of the soil it can be predicted whether nomads can be settled as agriculturists, etc. A knowledge of botany and of ornithology is useful, but less so than that of geology.

23. When the reconnoitrer takes up his headquarters in a town and can ride or walk and sketch or photograph round about its neighborhood at leisure, his work becomes that of a special reconnoitrer, not touched on here.

24. Let us now assume the case in which it is necessary to draw up a military report on a province with a sea coast of from 100 to 200 miles long, and an area of some 100,000 square miles, during the few months of cold weather, three or four, during which it may be possible to be exposed to the sun during the whole day, that is, a reconnaissance such as an officer serving in India might be called upon to make in some Eastern country beyond Indian limits. Such a report must include:

1. The coast line; its landing places, harbors, docks, dockyards, etc., and all communications leading from them inland.
 2. The chief communications of the country with the villages, towns and cities along them, illustrated by a route map, giving all the features of the country with an accuracy sufficient to meet military requirements. Traverses of the main arteries of communication which are also the main strategical routes will suffice. (See para. 26.)
 3. A description of the forts, fortresses, arsenals, manufactories of warlike stores, etc.
 4. An account of the military and naval forces.
 5. An account of the mercantile marine and trade.
 6. A general description of the country, its habitations and inhabitants, mode of living, clothing, habits, characteristics, etc., food, climate, *i.e.*, details of all matters affecting military operations in the country being reconnoitred. (See para. 4.)
25. Before entering upon the field work of such a reconnaissance, the officer carrying it out will be supposed to have attended to the suggestions made in paragraph 7, and to have provided himself beforehand with all the aids necessary to its rapid execution. Reconnaissances made without preparatory study can only be useful as a means of verifying military considerations of high importance, or completing our existing stock of information on particular points.

He will be assumed to have then in his possession charts of the coast and the Admiralty directions descriptive of it and the offing ; the best maps of the country procurable showing its towns, communications, mountains, rivers, etc., perhaps more or less imperfectly but still with an accuracy sufficient to direct his attention to points that it is necessary that he should visit, and giving the general directions in which he will have to travel. By previous reading he will have acquired a just idea of the climate he will experience, the character of the inhabitants of the country he is visiting, their mode of living, of travelling, money in use, etc. He will then land with a dress suited to the country, and at once proceed to provide himself with an interpreter and means of travelling. He will know what is already known, and not waste valuable time in but retracing the footsteps of others, which he certainly will do unless the suggestions given have been attended to.

It is most essential that the reconnoitrer should keep his own counsel, and understand that his success depends upon his keeping his intentions secret, and in the display of the tact necessary to avoid danger, whilst at the same time he carries out his intentions without attracting observation. He should confide in none and pass as a traveller : during his absence the less heard of him the better.

26. The nature of the field survey equipment required will be regulated by the following considerations :

1. Travelling and route surveying must be carried out conjointly and at the quickest possible rate. This rate will be found to vary : when strong ponies are used, between 30 and 40 miles a day. Besides the endurance of the "mount" that of the transport employed and the distances apart at which travellers' rests are met with, or water and grass are obtainable, etc., regulate the daily journey. If travelling is carried on continuously for three months without change of transport the rate may not possibly exceed 30 miles a day with mule cart ; 25 miles with pack mule ; and 15 to 20 miles with camel or donkey carriage or bullock cart ; if for six weeks only, at a stretch, a good pony will average 33 to 35 miles a day if a fast pace is not required of him, and carriage can be procured to keep up. So working, transport will be required to be fed on dry food.* A dry ration to be got in most countries is :

Barley, beans, gram, Indian corn, or millet grains,

Bran,

Chopped straw,

Salt,

well moistened and thoroughly mixed.

A reconnaissance survey is most conveniently carried out on horseback, and less so driving or in any sort of conveyance carried by porters. In the latter case, should there be any difficulty in changing carriers, the above rate of progress will not be attained ; if, too, the

* In all daily about 8 to 10 lbs. of grain and 8 to 12 lbs. of chopped straw.

district traversed is mountainous, a deduction on this account will be necessary.

2. Surveying from horseback, all changes of direction will be most readily taken by a large-sized (2 inches in diameter) pocket compass, hung round the neck and fitting into a high breast pocket, lined with (chamois) leather. A prismatic compass, provided with a rapidly steadying dial, may be carried in the holsters for exceptional use. Carefully select both.

The compass used by the explorer should be of the watch pattern with the card swinging with the magnet, and graduated to 2° or $2\frac{1}{2}^{\circ}$. (See sketch.)

This compass is not too sensitive, can be used on horseback, and the angle is taken from the breast, *i.e.*, "glanced," by bringing the mark on the rim, which should be 90° from the handle and check spring, into line with the direction of the road, or object to which the angle is taken and not the eye—an enormous advantage where secrecy is required.

The prismatic compass, Hunter's pattern, with line across the glass let into the top cover, can be worked from the breast; it is too large for the pocket, but could be made to suit, no doubt. Colonel Verner's compasses are unsurpassed, and he could adapt one to meet any requirements.

Working honestly and diligently with such an instrument, distances being measured by time (the watch) and checked daily by inquiry and astronomical observations as hereafter described, results are obtained that those who have only been accustomed to more accurate and less rapid methods will not readily realize or perhaps acknowledge.

A reconnaissance of 800 miles in a circuit, executed as above, on horseback, at a walk, at the rate of 25 miles a day, has been carried out by the writer, the result on return to the starting point giving an error of "nil" in longitude and 10 miles in latitude, showing how relatively correct such a survey may be. It but required to be pentagraphed in between the intermediate and extreme points determined astronomically to become a correct geographical map. (See para. 28.)

Routes run in any direction without closing on the starting point, for thousands of miles, have been found equally relatively correct.

Plane-tableing gives excellent results when surveying can be carried out openly; therefore have one handy for use where possible; for triangulating and projecting points that may be useful in tying the route survey with the plane-table work, not forgetting when triangulating that a base guessed at between two prominent points can be accurately determined later on by measuring a smaller one on the level.

3. Distances can only be estimated by time; therefore at each change of direction, or whenever a bearing is taken, both time and pace must be noted.

Baggage animals and transport generally march at a very uniform

pace; it is therefore best to work by both its pace and time. Noting halts and exceptional spurts or hindrances, the average pace is determined at the end of the stage and recorded.

27. The watch should be a silver half-chronometer, with a crystal glass face. A hunting watch, unless provided with a central cut to enable the watch to be read without the face being opened, should on no account be used.

The watch should wind up by means of a key.

The record of direction, time, nature of road, objects seen, cultivation, etc., to be at once noted in a pocket-book. The best size for this book is 5 inches by 8 to 8½ inches. Inside each cover should be a pocket for loose papers, and each cover should be provided with an elastic band and sheath for a pencil; when in use the elastic bands will prevent the leaves being agitated by the wind—a hard HH or HHH pencil is a convenient one for field use; the leaves should not be ruled. This book fits into an average-sized pocket or into holsters, and is of sufficient size to take in large tracts of country when used as a sketch-book. With practice the habit of writing whilst the horse is walking becomes easy, and it only becomes necessary to check him to take angles.

Commence by entering detail connected with the starting point: at every change of direction or of elevation, note time, bearing by compass, barometric reading and topographical details, etc. So on, *seriatim* treat all points worthy of note, such as obstruction, soil, cultivation, brook, river, branch road, etc. Note bearings of remarkable objects. Care should be taken to note down all impressions on the spot. Frequently observe temperature. When halting determine the barometric daily wave by hourly observations, recording shade temperature.

Daily at the halt call together the old men, carters, or muleteers from round about and interrogate them concerning roads to places of interest off the route traversed, and the surrounding country.

The reconnoitrer must devote his whole time and energy to the work and be continuously surveying as described, observing, interrogating, noting, etc.

When riding a restive horse it is necessary to work with a mounted orderly or servant. For greater secrecy it is best to work a few hundred yards behind the transport or escort, if one is necessary.

Surveying as above by time and direction, noting the horse's pace, or far better, the pace of the baggage animals, which is more uniform, checking distances by numerous inquiries from villagers as to distances from known points, the starting point, the objective point of the day's journey, a route survey can be laid down giving all details affecting military movements, etc., with sufficient accuracy; but for geographical purposes something more than this is required. The reconnoitrer must be in a position to lay down his route on a geographical chart.

28. To enable this to be done he must bring astronomy to his aid;

the heavenly bodies may, for the purposes of the traveller, be assumed by him to be so many fixed points to be, by simple means, transferred to his paper and used as checks to correct his daily route surveys, which for the sake of his own ease and for rapidity he has conducted as described. Every sailor finds his way across the trackless ocean by means of a few simple observations, and every soldier aspiring to be a general reconnoitrer must be able also, by simple altitudes of the sun or other heavenly body, to do the same on land. The word "astronomy" need frighten none; of its science the reconnoitrer need understand nothing; he has but to identify a star, by aid of a star chart which he should have in his possession, and to acquire the facility of taking its altitude and that of the sun, or the distances between the heavenly bodies—mere mechanical manipulations to be acquired by a little practice.

If time and secrecy admit, the traverse should be plotted daily. If the field-book is well kept, it can, at leisure, be placed in the hands of a draftsman to plot. The reconnoitrer should carry with him card-board scales 2 miles or 4 miles to the inch, for 2, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, etc., miles an hour, divided into hours and minutes.

By pentagraphing down this field plot on 2 miles or 4 miles to the inch, to a scale of 8 miles or 16 miles to the inch, etc., the result will be an excellent geographical map. Care must, in the first instance, be taken to correctly fix the main points on the smaller scale geographical maps by latitude and longitude, the work on the "dead-reckoning map" being pentagraphed in by sections between these fixed points.

Good results would attend the selection of the six most accurate and rapid reconnoitrers who yearly pass out of the Staff College for further training in a reconnaissance of a position or tract of country, conducted in some such manner as suggested, by compass checked by simple astronomical observations, and necessitating a ride of 30 to 40 miles a day, working against time, and immediately submitting report and sketch on completion of the staff ride.

The astronomical equipment may be:—

One 6-inch Hadley's sextant.

One artificial horizon (Captain George's, R.N.).

Two silver half-chronometer watches and a good chronometer, if it be possible to carry the latter.

The only other instruments required will be a travelling thermometer or two, in metal tubes (ordinary, and maximum and minimum), two well-tried aneroids, and a boiling-point apparatus for determining heights:—

One 2-foot ivory folding ruler.

One nautical almanac.

One star chart.

One range finder; refer to Colonel Verner's works for explanation of their great value.

Mathematical instruments.

One telescope or binoculars of best description and power.

One level (eye).

One 100-foot tape.

A photographic camera, 8 inches by 6 inches (best maker), with dry plates, plate boxes, etc., will be very useful if they can be carried or left conveniently at certain points so as to be available when required; or latest improved Kodak.

All requirements necessary for skinning birds and animals, and preserving their skins. A few lessons very desirable. Book for pressing plants.

Each man will also take with him the one or more books of reference that he prefers, but if he has learnt to understand the tables given in the nautical almanac before he starts, the fewer he takes the better. Raper's work is a valuable one and contains tables of logarithms.

The most convenient packing case for the instruments will be the portmanteau of spare clothes.

If a good patent portable log can be obtained for determining the rate of boats on rivers it should be taken, otherwise the boat's rate must be judged relatively to that of moving objects on the shore.

A lead-line, about 50 feet long, for soundings, provided with a lead sufficiently heavy to measure depths up to 30 feet and with alternate yards marked by red and blue tapes, should be carried in the holsters, as it is required whenever a river is crossed. When sailing, or when taking soundings of rivers with strong currents, a landsman will require practice in heaving the lead, and will find sounding to depths of 30 feet from a boat about as much as he can manage.

29. About personal equipment little need be said; each man has his own ideas upon this subject, and some are fond of luxuries and others are not; certainly, in the opinion of the writer, this is one of those times in life in which to be blessed with a superfluity of possessions is to be positively afflicted; to those who are of this opinion the following outfit may commend itself; in every case it must be borne in mind that the fatigue of travel and of continuous observation is very great, and that it is necessary to arrange everything so as to minimize it, and so to start a routine that thought need not be wasted on it:—

One valise, provided with cork mattress and pillow pocket sufficiently large to hold pillow, change of clothes, night clothes, slippers, etc.

* Blankets to be folded and laid flat over the cork mattress.

The edges of valise to be provided with broad flaps pierced with eyelet-holes capable of taking stout whipcord, so that its bottom and sides may be laced together. In the evening it is but necessary to unroll the valise and unlace the flaps to get to bed, and in the morning, to smooth out the blankets, lace the sides together, and roll up the valise, which is, of course, itself waterproof and provided with stout leather

* To suit the climate.

straps. If the weather is very cold, to sleep with the sides of the valise loosely laced together gives great additional warmth.

One handbag, to carry all toilet requisites, towel and odd requirements, such as hand-filter, penknife, boot-hook, corkscrew, matches, etc. During the midday halt this bag only need be opened. At the night halt too, very often, this alone need be unpacked, if the head-pillow of the valise has been well arranged.

One waterproof bag, provided with lock and key, to hold spare blankets, a suit of clothes, waterproofs, spare boots, leggings, one or two tins of food perhaps, and all odds and ends of requirements, *i. e.*, a sort of elastic reserve to hold the overflowings of other packages.

One portmanteau of spare clothes, to also carry the instruments, stationery, etc. Bear in mind that to most Orientals outside India, including the Chinese, short coats and tight-fitting breeches are indecent.

One box of provisions and a few medicines, with notes on their use drawn up by a surgeon, inclusive of three or four bottles of the best brandy, ointment for wounds and sore backs.

Saddlery.

Revolver, gun, rifle, ammunition.

One or more servants' boxes for pots and pans, small iron stove, and food daily required. Saddle-bags are most useful.

Waterproof sheeting. Presents to suit the country travelled in, and estimated to meet requirements.

The above alone is a formidable array of requirements, weighing, if the provision boxes are estimated at 200 pounds, 600 pounds and upwards.

Keep boots and leather-work well oiled; the army boot is an excellent one if previously prepared by being saturated with mutton fat; in wet and snow, smear over with mutton fat or oil. For very cold weather, sew blankets and furs into bags; poshteens are excellent. Carry insect powder and put camphor into pillow-case.

30. As to stores, study the foods of the country and adapt them to use; but however good they may be, a reserve of flour with baking powder, or soda, is desirable for the Europeans of the party. In hot countries a reserve of rice, sugar, and lime-juice is necessary; biscuits, when to take the place of bread wholly for three or four months, should be obtained from a ship-chandler's shop or Admiralty baker's at the last seaport at which procurable. Biscuits, rice, tinned butter and milk, if neither can be procured fresh, Bovril preparations, including soups, biscuits, lozenges, cocoa, etc., and Kopf's soups, tea, candles, and matches, will go far to meet all requirements. Flesh, fowl, eggs, vegetables, fruit, fresh or dried, must be sought locally.

All boxes should be packed, and loads bound up overnight; everything required to prepare the morning meal to be carried in saddle-bags, to be thrown over a load at the last moment.

The equipment enumerated meets all the requirements of necessity,

and provides sufficient comfort with the expenditure of a minimum of fatigue to secure it; a sufficiency of luxury to preserve health without adding greatly to the amount of carriage required, for it may be assumed that as the latter increases, chances of accident and delays increase, and mobility decreases.

31. Repeating the assumption made in para. 25, the reconnoitrer will, whilst journeying to his starting-point, have met merchants, pilots, ship-captains, hotel-keepers, and others connected with the land he is about to visit, and from each and all will have acquired information concerning the commerce, the people, the country, the harbors, and the thousand-and-one bits of practical knowledge possible to obtain from those alone who traffic with the people and live more or less amongst them. He will have learnt the prices of transport and riding animals, rates of hire of carts, carriers, etc., and having landed, can at once complete his equipment for the journey, and provide himself with an interpreter.

In many cases a groom will be found to be the best interpreter, even if his knowledge of English is imperfect, for an interpreter should be ever at one's elbow, and this is the most natural place for the groom (if the reconnaissance is carried out on horseback).

At times to be without an interpreter is of great advantage, particularly so when reconnoitring forts or intrenched positions; the customs regulating such reconnaissances are given hereafter*; to ask questions concerning them is often simply to court a false answer; observations relative to them, and to landing-places, depths of water, rise of tides, etc., must be matters of personal observation, or they will be often worse than useless, because misleading.

A guide who accompanies the reconnoitrer or traveller from fort to fort, and observes that he endeavors to penetrate each, and that he goes through the same pantomimic expressions of surprise each time that he is denied admittance, and yet that each time he walks round about, peers into gateways and embrasures, and spends some time in the neighborhood examining the country, the approaches and the commanding ground; and that so soon as he is at leisure perhaps he busies himself with note-book and pencil, becomes suspicious of his innocent intentions; whereas, supposing that he has trotted into the centre of a work without being stopped, if without a guide, the blusterings of the officials, in an unknown tongue, will be less provocative of harm than if he understood them; their revilings will not give him a moment's uneasiness, and whilst exhibiting surprise at finding himself an object of their wrath, he can display an utter indifference to proceed further, and yet not retire until he has carefully committed to memory many things worth noting.

32. Provided with interpreter and carriage, etc., a start can be made:—

* Pages 628, 629.

1. At the point of departure itself, or at the nearest point to it have your chronometers rated.

2. Work out the latitude and longitude of the starting-point (or take the necessary observations to be explained hereafter*) and compare them with the known latitude and longitude; or, if not known, do this at the nearest place to it, the latitude and longitude of which are known.

3. At this latter place take the bearings of the sun at sunrise and sunset, and at the time of the observation for longitude and meridian altitude. From these observations the error of your compass and the magnetic deviation can be hereafter determined.

4. Equipped with compass and half-chronometer watch suspended round the neck, and fitting into neck and breast pockets lined with chamois leather; with aneroid, travelling thermometer, glasses, Abney's level, 2-foot rule, tape and lead-line in the holsters and pocket-book in coat pocket, there is nothing in one's appearance to attract attention, and no instruments are to be seen. Be careful to look after the holsters yourself.

One chronometer and aneroid must go with the luggage and be kept as standards of comparison. Work as already laid down in paras. 26, 27, for route sketching, taking the time of each halt and its duration, if not working by the time given by the baggage transport, noting each change of direction and the pace. All works on reconnaissance lay down averages at which men walk, horses walk, trot, and gallop; let the reconnoitrer avail himself of these, but, in addition, each man should practically test the rates of his progress under varying circumstances, and also the time of traversing a mile, and distances covered in an hour.

A day's journey will be found to be in most countries a well established distance and not to vary 10 per cent. day by day.

In addition to the route survey, surveys of the environs of all important places will be required, together with sketches at various points of the route, to exemplify the nature of the country traversed. These may be outline sketches only, and can be taken without dismounting.

With the portable instrumental equipment noted in para. 27, the astronomical observations to be taken may be—for latitude:

1. Meridian altitudes of the sun and stars.
2. The altitude of the Pole star off the meridian (north hemisphere).

For longitude:

1. The altitudes of the sun and stars taken for watch error (longitude), the former being taken about 8 or 9 A. M. and 3 or 4 P. M. Observe temperature (shade) and barometer.

Regularly observe the rule of getting morning and evening sights for chronometers and for latitude, observing as many altitudes of stars as may be considered necessary.

* Pages 630, 631.

Work out before starting the approximate times that various stars will cross the meridian. (See page 631.)

It may not be possible, without much waste of time, to take the longitude of the place the latitude of which has been determined by the sun or stars; it will be sufficient in such cases, the intermediate distances traversed being short, to connect the two by the route survey (or dead reckoning) and bearings to distant remarkable objects, the bearings of which objects should be continuously observed as checks on the work.

Observe, when convenient, the times of the rising and setting of the sun and the direction of its centre by compass.

The centre of the sun is on the horizon when it appears its own diameter above it. Take also the direction of the sun's centre by the Azimuth-compass, at the time that a double altitude of the sun is taken; this observation, with a knowledge of the latitude and Greenwich mean time approximately, will enable the compass error to be determined, *V. U. S.*

Work up the note-book every night so that it shall be perfectly legible, add general observations on the day's journey; trust nothing to memory. A chronometer watch will measure short meridian distances and connect one place with another, so that all may be relatively right; the watch must be treated with great care. Compare the two chronometers nightly, and determine the watch error at every place the latitude and longitude of which are known, and finally at the end of the reconnaissance at the place the latitude and longitude of which were in the first instance determined. The error so worked out will give an idea of the accuracy of the whole work; it has probably been accumulative if the chronometers are good ones and have been treated with care, and can be distributed throughout the survey.

Have the chronometers rated on every available occasion.

33. When the reconnoitrer has mastered the rapid means of route surveying described and of checking his work by simple altitudes of the heavenly bodies, the interest of his subject will naturally lead him on to more difficult astronomical observations, giving proportionately more accurate results. Upon these it is unnecessary to touch here, as they would but complicate the method of carrying out a rapid military survey which it has been the object of this paper to show to be easy of attainment, to meet all military requirements, and many geographical ones without attracting undue attention; indeed, with secrecy. What is wanted is accuracy within itself, and this can be obtained by the methods indicated.

34. Equipped as described in para. 32, the reconnoitrer mounts his horse as if bent on a ride of pleasure; the use of a pocket compass on horseback, driving, etc., is not much noticed; it is held on a level with the chest and not to the eye; star observations, using the sextant and artificial horizon, can often be carried out in the early night.

These and sun observations will never attract much attention so long as it is explained to the onlookers and the curious that the sun is the clock by which you travel, and that as you journey your watch must be daily corrected; that you wish to ascertain the direction of Mecca, etc. To thoroughly impress this point it is as well to provide the interpreter with a watch to be kept daily at local time; you will at the worst be thought to be a pedant, and most suspicious of being led in a wrong direction; and you but do what every traveller should do in a country of which imperfect maps only exist, that is, prepare one for his own use and the advantage of others who may follow him.

CONCLUDING REMARKS.

The form that the report will take must necessarily vary; guides are given in all "Handbooks on Intelligence."

In drawing up his report the reconnoitrer must bear in mind that it should include not only his own observations, but as well references to those of others, and that it will be necessary for him to extract from the teachings of conventional geography all that is inseparable from the study of nations and peoples. This "Political Geography" should give all the information concerning ethnology, races, religions, geography, etc., that may be necessary, when read in connection with history, to enable the political or military reader to be prepared to meet all accidents, either political or military, and thus deprive accidents themselves of the character of emergencies.

If not already compiled, it is necessary that the report should treat of Government and Government officials, so that those who reconnoitre after him may start with his own full experiences.

The greatest value of a general reconnaissance will be attained if it enable a government to further a policy of intuition and energy, and to act with foresight and continuity of purpose, and it, by a previous study of the conditions of the game that it may have to play in any country or field of enterprise, it insures that it shall meet its adversary there at least on equal, if not with superior, chances of success. To illustrate my meaning, I give below extracts from recent writings on India and China; they might be multiplied *ad infinitum*, but they will suffice to show the value of general reconnaissances, for it would have been the duty of the reconnoitrer to have reported on the points so prominently brought to notice therein, and not only to have drawn attention to their importance, but also to their relative importance with reference the one to the other.

A correspondent thus writes to the *Morning Post* regarding "The Need for Action in India":

"I have been struck by the evils that result to nations from the procrastination of their rulers and their neglect to avail themselves of information at their command or to give to it its proper relative value. The immediate evil to which I would refer results from India's neglect

of Baluchistan, a valuable outlying province which she leaves in a state of uncivilization and stagnation so reprehensible that the Goddess of Progress is now avenging herself on her for this sin of omission. Years ago Baluchistan was ripe for improvement, for the construction of a pioneer railway from Quetta—dipping southward and westward to Seistan to tap the trade to Central Asia and with a connection with the Persian Gulf—and for canalization by utilizing the waters of the historic Helmunh, a river once bordered by cultivation studded with numerous cities. India's action 'as regards Baluchistan has been unstatesmanlike, petty, and parochial, and had Russia been her mistress these works and more besides would have been carried out. Under the guidance of a master-mind new-born Africa is outstripping India in progress, and even the Soudan has its railway, and if India does not know how to lay a cheap line of a like nature let her requisition a batch of Lord Kitchener's officers to do the work for her. Had these works been initiated a decade ago India would not now be envious of Russia's civilizing action, and of her determination to do what she has neglected, and will do for her unless India does it at once. We should copy Russia's policy of constructing pioneer railways in Asia, and run our rails to meet hers, so that civilization may be advanced and commerce be unimpeded, and we continue to hold our due share of it."

The committee of the Shanghai branch of the China Association, writing in January last on the present condition of foreign trade with China, attributes "The hitherto neglect of the China question by our Government, and the policy of drift into which we have fallen, to a mistaken estimate of the strength of British prestige in the Far East, coupled with a fallacious belief in the power of China herself; the nations, newer in the field and comparatively unhampered by traditions of the past, have seemingly been better able to interpret events in the light of common experience, and have found opportunity in our complaisance and inactivity to exploit the situation to our disadvantage"; and again they point out that it is "A great error to proceed on the assumption that the few high officials who, with the Court, may be said to constitute the central Government, are desirous of seeing China strong, or of maintaining the integrity of the empire. The people wish it, but public opinion can scarcely make itself heard, much less can it be proclaimed in a way that will influence the Government," etc.; and again: "It may be fairly claimed that the British Government has received, from its ministers, consuls, and merchants, a sufficiency of facts, opinions, and suggestions from which a definite and resolute policy might long ago have been deduced. The future of our relations with China may safely be gauged by the experience of our relations with China in the past; nothing has ever been gained from China except through pressure, backed by force, and nothing will ever be gained from her except by the same means."

That general reconnaissances of countries bordering our empire and

through which our Imperial communications must eventually run, *i.e.*, of China, Siam, Persia, Turkey in Asia, Afghanistan, etc., should be thorough and up-to-date is of the greatest national importance, and that they should be studied when made, of no less importance; for it will always fall to the lot of men who sit in official arm-chairs to decide on the action to be taken; and this is as it must be; for it is possible that the reconnoitrer may have been influenced by his surroundings; the fatigues, discomforts, and dangers incidental to his work, and his reports tinged by enthusiasm or despondency, or what may be termed his "personal error," according as his temperament is sanguine or the reverse; and moreover the home official alone has full knowledge of the bearings of other questions upon the one specially reported upon.

In writing a paper on a subject of such wide extent as the one treated, it was the intention of the writer to confine himself to its main lines, and in no way to tread the by-paths of special considerations. For notes on details, see "Reconnaissance Handbooks." To make the paper more complete a few details are touched upon in the Appendix.

After reading the works of a traveller, and marvelling at the excellent maps he has produced, one naturally asks one's self, "How did he do it?" The foregoing remarks, it is hoped, will explain how it might have been done. The methods advocated have been practically tried over an extensive area and found to give good results, far better than many will anticipate.

Also one marvels at the prescience of a general who has foreseen difficulties, avoided dangers, and anticipated the very battle-fields on which campaigns have been decided and the fate of nations determined, and one again questions how it was done; and again it is hoped that the preliminary remarks of this paper on general reconnaissances will answer the question. To do it, however, it is necessary to use the proper agents, *i. e.*, a body of officers trained to a certain standard and working to one end. This training the Staff College course endeavors in a uniform manner to supply, and to men so trained and to others who, by character and tastes, are fitted to carry out general reconnaissances, those responsible for the conduct of affairs turn for aid—at least, they do so if well advised. Those will cavil at this statement who decry all uniformity of training as a bar to genius and a drag on originality; let the adage of the strength of the bundle of sticks be borne in mind, and be sure that genius and originality, whilst drawing advantage from training, will also learn from it when to throw off its trammels and break through its bonds should circumstances arise rendering it necessary and advisable to do so; for genius was never stayed by rein or curbed by bit, and the members of the bundle—symbolizing a body of uniformly trained staff officers—are doubtless content to form part of it and to be handled by one understanding its strength. It was not genius and originality that enabled Germany to overcome France, but system, gained by training and welded by discretion.

It may be argued also that England has never worked thus and has never troubled herself about information and reconnaissances, and yet that she is to-day a great empire encircling all nations. To this it may be answered that she has always, unconsciously to herself, so worked. The officers of her navy and mercantile marine, her merchants, pioneers of commerce, her adventurers, have always been the best of intelligencers and appreciators of the nation's wants. She may be said to be a nation upon whom the enterprising spirits of her sons have forced greatness.

It behooves Great Britain to beware how she lays down the rôle she has thus been elected to play in the world's history, and how she allows herself to get out of touch with her environments; to lose touch with them, to stagnate, will be as surely to die as have died the nations that educated the world before her.

But times have changed, and the tide of opinion has ebbed, and free spirits must seek other outlets and suffer themselves to be curbed by an organized system which can now alone take the place of that self-organized, and so carry on the work so ably performed heretofore by the nation's often wayward, generally irresponsible, yet nevertheless boldest and truest sons.

One may praise the dead without causing a blush to suffuse his cheek, and the late Major-General Sir C. MacGregor was one of Britain's most prescient reconnoiters. The late lamented Captain Gill was also one of the most enterprising and noble of these: enterprising because, despising the luxury at his command, he voluntarily elected to encounter dangers, difficulties, and fatigues; noble, because he staked all for a reputation to be gained only at enormous risks. Losing his life, he gained the reputation he desired—and that a true and not a bubble one—perhaps impossible to have gained at a less risk or cost.

The reconnaissances of the Russian Colonel Prjevalski are instances of the value of the explorations of one man, should he be a trained observer. No one who has read his works can doubt of their military, in contradistinction to their scientific value, which is patent to all. The opinions of such an officer are perhaps of more value than that of a whole commission, because formed by one trained intelligence cognizant of all details. In one person we find here combined the soldier, sportsman, botanist, ornithologist, geographer, and exploring surveyor. Let others endeavor to tread in his footsteps.

Russia, by utilizing the information recorded by him concerning China, has already reaped incalculable advantages over other nations, Great Britain included, who have neglected it.

The results of the expedition about to explore the sources of the Yellow River, under the guidance of Russian military officers, cannot but be productive of important results; for Kashgaria borders on Turkistan, and is only separated from it by the Gobi Desert, in places not the impassable obstacle it is supposed to be. The population of both is

Mahommedan, ready to overflow from their overcrowded oases into Kansuh, whose Mahommedan peoples have already proved to be a sword in the heart of Central China, to the Chinese Government. *Verò sap.*

APPENDIX.

AMPLIFICATIONS.

Para. 24.—1. In carrying out the reconnaissance of a coast line, an Admiralty chart is required to indicate the nature of the offing and depths. The land reconnoitrer must walk or ride along its edge.

2. Before a valuable report can be drawn up on an arsenal, dock-yard, powder manufactory, etc., several institutions of a like nature should have been visited and their machinery, process of manufacture, etc., studied. Torpedo works and schools of electricity, etc., now form integral parts of the war establishments of even fifth-rate Eastern Powers, and such-like matters must be generally understood.

Para. 31.—In conducting a reconnaissance of foreign armies, navies, and fortresses, when specially deputed and officially accredited, the greatest tact and strictest discretion are necessary. Any attempt to procure information secretly and on forbidden grounds, which cannot be obtained in the everyday intercourse permitted with the troops, would be unjustifiable and compromising. Official introduction and consequent courtesy received compel the reconnaissance officer to restrict himself in his reports to what has been voluntarily placed within his reach. Should there be reason to suppose that the latter does not meet the ends desired, freedom of action can only be resorted to on the conditions of having no further reference to and taking no further advantage of the support or assistance of the authorities of the country in which he intends to travel and gather information.

Even in the latter case he is not quite free and unfettered. To bribe employés with money, to make surveys, to photograph and sketch in the vicinity of fortresses, are forbidden by the laws of all countries, and the reconnoitrer must be careful of infringing any of these laws.

There are no laws against studying existing maps issued to the public; therefore, the actual reconnaissance may be limited to mentally bringing information up to date and noting changes; in a large fortress noting, not the trace, except in so far as it deviates from the plan in possession, but revetments, whether covered, and of what material, etc., commands, casemates, new works, etc., *i. e.*, details not shown by a glance at a map.

The map of the surrounding country must be carefully studied and the position and communications thoroughly reconnoitred; the military history of the ground—*i. e.*, battles fought over it, sieges it has witnessed, etc.—must be learned beforehand.

In the case of works of moderate extent and simple trace the reconnoitrer need but leisurely pace its chief lines, noting direction, profiles

and lengths; memory and eye will not fail to enable him to retrace his footsteps on paper and to lay down sketch profiles sufficiently accurate for all practical purposes. This should be done on the very first opportunity that offers, and the works again visited, if possible, to test its accuracy and to make additions.

"Snap-shots" by Kodaks can be taken without attracting observation and enlarged at leisure with excellent results, but the most zealous seeker after information must be careful to do nothing that may compromise his government, and remember that the police exercise the right of searching the baggage of suspected persons. He may often have to adopt a shorthand and symbols of his own, and to jot down notes where they are least likely to be looked for or recognized as notes if found.

On account of the restrictions placed upon the free action of a reconnoiterer it is often better for him to have nothing whatever to say to the authorities of his own country; he can always claim from them the consideration due and invariably conceded to travellers, beyond which nothing is required.

Para. 32.—It is beyond the scope of this paper to enter into the solution of the astronomical problems involved in fixing latitude and longitude; it will suffice to explain the observations required to be taken, *i. e.* :—

1. Determination of the index error of the sextant.
2. Determination of the altitude of the sun or a star.
3. Determination of the stars crossing the meridian and approximate time of doing so.

The relative positions of the principal stars can be readily determined by means of a star chart.

Sextant Error.—Obtain the index error by observing the sun with the images in contact, and causing them to traverse one over the other. Let the readings be R^1 and R^2 ; then the index error is half the difference of the two readings on or off, according as R^1 is greater or less than R^2 .

N. B.—One-fourth of the sum of the two readings equals the semi-diameter of the sun, given in the Nautical Almanac for each day of the year. This checks the above observation :—

If the readings are both on or both off, the index error would be the sum of the two readings.

Or :—Obtain by observing a star or very distant object and making both images coincide; the reading on the vernier then gives the index error.

The necessary instrumental adjustments are given in works on surveying, etc.

Altitude of the Sun.—The lower limb (L. L.) of the sun is observed in the morning, when the mercurial sun (sun seen reflected from the mercury) is rising (using the astronomical telescope).

Bring the two images to a slight overlap and note the time at the instant of its disappearance. This must be repeated about seven times as rapidly as possible in order that a correct mean may result.

The upper limb (U. L.) must be observed in the afternoon, when the mercurial sun is sinking.

The morning observation should be taken about 8 or 9 A. M., and that in the afternoon about 3 or 4 P. M.

N. B.—The image of the sun in the mercury is inverted. An astronomical telescope inverts an object or image observed.

In taking a meridian altitude of the sun, bring its two images into exact contact on the L. L., *i. e.*, with the mercurial (rising) sun at the top; keep contact by the tangent screw, bearing in mind the direction in which you are turning the screw and never turning it in the contrary one (to do so is fatal to the observation). So soon as an overlap occurs instead of a gap, the sun's greatest altitude has been attained and the sun's motion in the heavens has been reversed. The reading of the instrument gives the sun's meridian double altitude from which the latitude can be readily deduced. This observation, which must be begun a little before apparent noon, also gives the time of local noon. When a star is observed the two images are made to coincide.

Every night take the altitude of the Pole star, noting time. Having set the sextant to double the approximate latitude, the star and its reflected image will be found readily in the field of the mercurial horizon :

Be careful to see that the mercury finds its own level.

Use the astronomical telescope on all occasions.

Keep watches at Greenwich time.

Stars Crossing the Meridian.—By sextant and artificial horizon the altitude of a heavenly body cannot be measured unless it is between about 15° and 60° .

A star to be observed must therefore come on the meridian during the night and at an altitude of between 15° and 60° . It should be of the first or second magnitude. Having consulted a star chart and the heavens, and thereby determined the names of the stars near the meridian (approximately a great circle passing through the Pole star), to obtain the approximate apparent time of any one of them passing the meridian by means of the tables given in the Nautical Almanac, subtract the sun's right ascension from that of the star (increasing the star's right ascension by 24 hours if it be less than the sun's right ascension), and the remainder is the time required.

The altitude of any star when passing the meridian equals the sum of the co-latitude (90-latitude) of the place and the declination of the star, when both are north or south, or their difference when of contrary names; the altitude to be reckoned from the south point of the horizon when the latitude is north, and the contrary when south; but when the sum exceeds 90° it is to be taken from 180° , and the altitude is to

be reckoned from the north in north latitude and the south in south latitude.

All astronomical observations to be balanced and weighed and noted as "very good," "good," "doubtful," etc.

If possible, go through the course recommended by the Royal Geographical Society prior to starting on the reconnaissance.

THE YANKEE SOLDIER.

(From the Army and Navy Gazette, London, June 17, 1899.)

MR. POULTENEY BIGELOW delivered a lecture on "The Yankee Soldier as I Saw Him at Tampa and Manila During the Late War" at the Royal United Service Institution on Monday last. The chair was taken by Major-Gen. J. Maurice, C. B., and there was a large attendance of ladies and gentlemen.

The chairman briefly introduced Mr. Bigelow, who stated that the Mexican War was the first war waged by the United States against a foreign enemy. The success of that war was largely due to the fact that the army was made up of trained soldiers led by trained officers. In the great Civil War it was not so; great volunteer armies were raised and entrusted to politicians knowing little of soldiering, and awful waste of life was due to their incompetence. When the Spanish War began the same faults were made. In Washington he found the heads of nearly every department not only not drawn from West Point, but disliking the graduates of that department. Positions of high rank in the army were almost uniformly filled by men owing their station to political influence; even Gen. Shafter was unfit for other than office work. At Tampa there was no evidence that any staff officers existed. Water was lacking, the uniforms were unsuited to the tropics, and disease was soon rife, there being a complete breakdown of all the machinery which should provide the soldier with food and equipment. Everywhere was the smell of political jobbery. As to the Regulars at that camp, 15,000 in number, they were a capable set of men, well officered, well disciplined, ready for work, and full of bravery and dash. "Whenever," said the lecturer, "you hear of the swaggering and bragging Yankee, you may be sure that it is not among the officers and men of the Regular army. All the swaggering and bragging is made by the political soldiers, who become intimate with newspaper reporters and keep their names unduly prominent before the ignorant readers at home." The courtesy of Englishmen had handled this subject with striking reticence. At Manila he found the Yankee soldier much the same as at Tampa, only more so. There, too, were volunteers, and he was struck by the contempt they entertained for their officers and the strong desire they had to return home. This was due to the political appointments made and to the men not being professional soldiers. The raw material was, however,

excellent. The war had been discussed from the naval point of view by Admiral Colomb, but no one had as yet dealt with its military lessons. Congress had enlarged the army, but done nothing to obviate the most glaring abuses pertaining to the feeding, transporting, and military conduct in time of war of the troops. The American soldier was mortified at the work done in the war as unworthy of a people distinguished for its organizing capacity, its shrewd business sense, and above all its mechanical expertness. He did not depreciate volunteers in a national war, but they wanted good leaders, and he could not mention a name above the rank of colonel that did not smell of the politician's ante-room. Difficulties arose, too, as to contracts, and there must be some explanation as to all these matters.

Surg.-Gen. D. O'Dwyer, commenting on the lecture, remarked that Mr. Bigelow had said a great deal about the mismanagement of the American army, but could he explain how it beat the Spaniards so easily at San Juan?

Mr. Bigelow, in reply, said the fight at San Juan had been a "soldiers' battle." The officers had had nothing to do with it. The commanding officers in the rear did not know what the men were doing till long after the fight was over. In reply to a further question put to him by Major-Gen. Pollock, the lecturer was unable to give any information as to the part taken in the fight at San Juan by the Gatling battery.

Rear-Admiral Holland asked for information with regard to the commissariat at Manila.

Mr. Bigelow replied that when he went to Manila he found the American troops doing all the commissariat work whilst the Filipinos roosted about on fences like fowls and watched them. He had told Gen. Merritt that this mode of procedure scarcely realized his idea of the domination of the Anglo-Saxon race. Gen. Merritt was rather huffy and said it was easy to criticise. He had replied that he thought it was under the circumstances. That had made Gen. Merritt more huffy, but he had since got married, and he did not bear him any grudge.

Gen. Maurice, in moving a vote of thanks to the lecturer for the paper, said he was sure his audience would agree that Mr. Bigelow had acted as a true patriot in speaking out as he had about the late war. He had brought out the truth in order that what was wrong might be put right. He himself had studied the campaign in Cuba with some closeness and he had come to much the same conclusion with regard to it as Mr. Bigelow. He thought the moral America ought to draw from it was that it was not possible to disband an army immediately after a war, and expect to raise another one at any time when the need might arise. Absolutely untried soldiers flung on the shores of a foreign country could not be expected to do great things until they had learnt soldiering by hard experience, and it was necessary, he thought, that America should realize this.

THE BRITISH ARMY IN 1898.

A BLUE-BOOK has just been issued from the War Office containing the preliminary return of the British army (prepared in anticipation of the general annual return) for the year 1898, together with abstracts from the returns for the period between 1879 to 1898.

The return consists exclusively of statistical information, and the first table shows, by arms, the effective strength of the Regular army on the first day of each month during 1898 and the average strength during the year. The average strength of all arms during the year was 225,027, which (as shown by table No. 7) is an increase of 5744 upon the average strength in 1897, and an increase of 34,737 over that of 1879. The average strength of the different arms last year was as follows: Household Cavalry, 1305; Cavalry of the line, 17,848; Royal Artillery—horse 3669, field 14,932, mountain 1383, garrison 18,326; Royal Engineers, 7860; Foot Guards, 6958; Infantry of the Line, 138,033; Colonial Corps, 6312; Army Ordnance Corps, 1373; Army Medical Corps, 2835; Army Pay Corps, 580. By ranks this average strength was made up as follows: Officers, 7880; warrant officers, 923; sergeants, 14,435; trumpeters, drummers, and buglers, 3494; rank and file, 198,295. The average strength at home was 102,202—75,432 in England, Wales, and the Channel Islands, 4069 in Scotland, and 22,701 in Ireland; and abroad, 122,825—49,932 in the colonies and 72,893 in India. The effective strength on January 1, 1899, was 231,851 of all ranks, and the number wanting to complete in rank and file was 848. On the corresponding date in 1898 the number of effectives was 212,393. During 1898 there was a total increase of 47,303 in the number of non-commissioned officers and men; 2578 died, 12,983 were discharged, and there was a total decrease of 37,323, leaving a net increase of 9980.

Of the recruits finally approved, 38,890 in number, 30,764 were raised in England, 3950 in Scotland, and 4176 in Ireland. During 1898, the total number of recruits who joined the army was 40,701, and of these 1530 were under 17 years, 212 under 18 years, 17,362 under 19 years, 8538 under 20 years, 4242 under 21 years, 2738 under 22 years, 2162 under 23 years, 1313 under 24 years, 950 under 25 years, 193 were 25 years and upwards, and the age of 1461 recruits who joined colonial corps is not reported. No fewer than 12,715 of these recruits stood 5 ft. 7 in. and upwards, and 6238 were under 5 ft. 4 in. The largest number of tall men was enlisted for infantry of the line—namely, 4024, the Royal Artillery being next with a total of 3200, the Foot Guards taking 2197, and cavalry of the line 2061. To the Household Cavalry 121 recruits were added, and of these 118 stood 5 ft. 7 in. or more, the remaining three being under 5 ft. 4 in., and all but two weighed 130 lbs. and upwards.

The total number of men who re-engaged after service ranging from

nine to 12 years was 2981, and 4806 men originally enlisted for short service extended their engagement with the colors to complete various periods of service. In all 12,983 men were discharged, including 1945 for misconduct and 3683 as invalids. The number of pensions granted was 2773, 1678 being permanent and 1095 temporary. Table No. 19 relates to the number of desertions in 1898 from each arm of the service, and shows that the proportion of net loss from this cause per 1000 men was greater in the cavalry than in any other arm, namely, 18 per 1000, the proportion being 15 per 1000 in the Foot Guards, 12 per 1000 in the Royal Artillery, and 10 per 1000 both in the infantry of the line and in the colonial corps. The Royal Engineers show the smallest proportion of desertions, while (according to table No. 31) the number of men per 1000 of average strength fined for drunkenness was greater in the infantry—namely, 55 per 1000. In the Household Cavalry only one man per 1000 of average strength was fined for the same offense. The total number of men serving at home on January 1, 1899, who were in possession of good conduct medals and gratuities was 508, and 713 had similar medals without gratuities. In addition, 34,734 men were in possession of good conduct badges. Of the non-commissioned officers and men serving at home at the same date 79,001 were English, 8890 Scotch, 12,578 Irish, 1325 were born in India or the colonies, 33 were foreigners, and the nationality of 262 is not reported.

Table 43 shows that the total number enrolled of all ranks in the Army Reserve, Militia, Yeomanry, and Volunteers was 433,163, and 56,851 were wanting to complete. On January 1, 1899, the Army Reserve consisted of 78,798, and of these 45,059 were under 30 years of age.

SOME PHASES OF THE PHILIPPINE SITUATION.

BY JOHN BARRETT, LATE UNITED STATES MINISTER TO SIAM.

(From the *American Monthly Review of Reviews*, July, 1899.)

THE editor of the *Review of Reviews* has asked me to discuss the present crisis in the Philippines from the standpoint of a personal study of the situation. He wishes me to state facts and describe conditions as I have seen them. If any arguments or conclusions of opinion are advanced, they are to be based on my own observations or on those of men with whom I was associated in the Philippines.

While appreciating the honor of this invitation and the opportunity of reaching the large and intelligent constituency of the *Review of Reviews*, I do not claim infallibility of fact or judgment. I shall simply endeavor to tell the truth as I know it, recognizing however, that there are others who may have acquired different impressions from the same

incidents and hence drawn contrary or conflicting inferences. There will be, moreover, only space and time for consideration of some phases of the situation, and not of all its complex features.

My interest in the Philippine Islands dates from my original visit to the far East, over five years ago. Although my work as a diplomatic agent of the Government did not bring me in direct touch with Spain's Asiatic possessions, I took advantage of the first opportunity to go to Manila.

There was a fascination about this great unknown group of islands bordering on the China Sea that impelled me to learn something of them. Only 640 miles from Hong Kong, and holding a position in the south as important as that of Japan in the north, they were comparatively a *terra incognita* to the oldest residents of the Asiatic coast. In Hong Kong, Manila's nearest neighbor, there was a mystery about them that strongly excited one's curiosity. The great sombre buildings of the Dominican fathers and other religious orders which were known to be connected with similar societies in the Philippines, set back into the rocks of Hong Kong, with their massive high front walls as if designed and built to keep out the vulgar and curious, seemed symbolic of these islands, strange and hidden to the world. They were near at hand, could be seen and entered, and yet few went within their portals. When I questioned my old and hospitable friend, the Spanish consul, Señor Don José de Navarro—who, by the way, was once consul at Baltimore and a popular member of the Maryland Club—about Manila and the islands with reference to visiting them and satisfying my curiosity, he either was woefully ignorant or, under this same mysterious influence, refrained from telling me what he knew. This happened long before the war, but I have been told that he still thinks that I was even then seeking information for my Government!

FIRST TRIP TO THE ISLANDS AND IMPRESSIONS.

Matters were finally arranged. I endeavored to go incognito, as it were. That is, I planned to visit the islands as a private American and not as a minister of the United States Government, because I knew the Spaniards were great sticklers for rank and would hamper my movements with their attentions. In my anxiety to succeed in my plans I shipped on a small tramp or coasting steamer, ran into a typhoon, was nearly wrecked, and took ten days to make land where less than three with ordinary slow vessels are required. But I was well repaid. Two weeks in Manila were followed by trips to Aparri in the far north and up the great Cagayan River; through the valley on the immediate north of Manila to Dagupan, over the country which is now the scene of our campaigns under MacArthur; to the west along the Laguna de Bay, and to the south, past where the battles of the last few days have been fought under Lawton; and finally to the islands of the Visayan and Sulu groups, and Mindanao further to the south. During these exten-

sive travels I never dreamed that I was studying future American territory, but I was deeply impressed by the great natural resources of the islands, their marvelous fertility and productiveness, their agricultural, mineral, and timber wealth, and, above all things, by the hospitality, generosity, and good-nature of the people, whether I came across them in the towns or back in the country.

EXPERIENCE WITH ASIATICS.

They may be our foes now, but that should not keep me from describing them as they appeared in times of peace. Everywhere I journeyed they reminded me of the Siamese and Malays in habits, customs, manners, stature, and complexion. Possibly this may have been the secret of their friendly attitude. From my experience with similar races, I treated them as I wished to be treated. In extended travels in the distant interior of Siam and the Malay Peninsula, and later in the Philippines, I never carried any weapon whatever, was never seriously molested, and invariably left my native hosts, even when most primitive in habits and education, as my good friends. In fact, it is my opinion, based on considerable experience and supported by such excellent British authorities as Sir Frank Swettenham and Sir Andrew Clarke, that if a man proceeds in the right way and in knowledge of their character with these southern Asiatics, he can do almost anything with them. John Foreman and Dean Worcester in their books point out similar Filipino traits of susceptibility to tactful influences which I noted among the Siamese and Malays and confirmed also among the Filipinos.

SOME MARKED MALAY CHARACTERISTICS.

By these suggestions I do not intimate that they are not lacking in bad traits. They have many of them, but their good qualities seem to outweigh the bad, and the latter are not troublesome or offensive to foreigners if they know how to manage the average native. They are treacherous at times, but when in that mood are usually inspired by conditions that possibly their untutored minds do not grasp and analyze.

A marked Malay characteristic is an intense desire for revenge when he believes that he has been wronged. His thirst for the blood of his victim is then often unquenchable. He will die himself in his head hunt. If he is excited to the degree that he runs "amuck," he will kill the members of his own family or his best friends. More than once have I dodged a crazy Malay who was running amuck for no reasons connected with myself. And yet such incidents are very rare, and one may live for years among the people and have no experience of this nature. But while the Malay or Filipino—for the latter is a branch of the former race—will commit atrocious acts when inspired by a desire for revenge, he will, on the other hand, when satisfied that he has made

a mistake or has been deceived in his hostility, become an equally devoted servant and follower of his real master.

OUR GREAT HOPE WITH THE PEOPLE.

Possibly here is our great hope in dealing with the Filipino masses. When they are taught to believe and are actually convinced that the Americans are in fact and in intention their friends and benefactors, they will become even more faithful supporters of our Government than they have been of their own. It may take some time to accomplish this, because all of their education and experience heretofore has been against their having confidence in foreigners. When we expect to overcome in a few months the influences and traditions of three centuries, we must be charitable if the war is not ended at once and the "friendlies" sometimes turn out to be foes. The change must surely come in the order of events and bring with it peace, order, and contentment equal to that which Britain has established so successfully, even following war, in Burmah and the Malay Protected States, and the Dutch so well in Java.

EFFECT OF QUELLING REVOLT.

The lesson is severe, the cost dear, and the situation full of trials, but if we support the Government in its intention to put down the rebellion and do not hamper the commanding officers of our army and navy in their efforts, we will not only end the conflict sooner, but, by bringing the people to their senses and showing them that they have been mistaken in their judgment of us and misled by ambitious leaders, do them directly the greatest good and make them faithful and lasting supporters of American jurisdiction. It is remarkable that the tribes of similar races which England has thoroughly punished for revolt and insurrection have become her most faithful subjects, while those only partially subdued have repeatedly risen to give her trouble.

It was good policy to avoid war as long as possible. Many of us opposed it with great earnestness of argument, knowing the effect on the Filipino or Malay nature, and I went so far in public statement to deprecate a conflict before the outbreak that I am now openly accused of inconsistency in urging that the war be vigorously prosecuted to an end. But the same knowledge of Asiatic character that impelled me to oppose fighting, if possible to reach an understanding without it, now inspires me in my desire to see it carried through to early and complete success.

If individual paragraphs of my addresses delivered in the Far East, London, and later in New York and Chicago be quoted without reference to the remainder of the context or the time of delivery, as has been done by some of my critics, my observations on Aguinaldo, the natives, and our policy may seem slightly at variance; but a consideration of all I said will likewise prove that I have not been inconsistent.

In this connection I will quote what one of the ablest colonial servants of Great Britain, who has had long experience with the inhabitants of the Malay Peninsula and Borneo, said to me recently in London: "It would have been a great blessing to have established government without war; but it will be a greater blessing, now that you have war, to destroy quickly and effectively every vestige of insurrection. The first situation might never have been followed by general rebellion during American control of the islands, but the last situation once ended will remove forever all probability of further organized and active revolt."

STUDYING THE SITUATION IN WAR-TIME.

My second trip to the Philippines was made in May, 1898. After surrendering my post of duty at Bangkok, Siam, I went direct to Manila after a brief stay in Hong Kong. By courtesy of Admiral Dewey I made my headquarters on the ships of his squadron from then until the fall of Manila in August. During this period much of my time was employed in newspaper correspondence—a class of work that gave me excellent facilities and reasons for spending as much time on shore as possible, first with the insurgent leaders and forces in and about Cavité, Bakor, and Imus, and later with our army and its operations before Manila. After the fall of Manila I devoted my energies and time for several months to studying carefully different phases of the questions involved in our occupation of the islands, and took advantage of every opportunity to familiarize myself with the natives and their government and the army headed by Aguinaldo, as well as to make occasional trips into the neighboring interior. When there was a lull in affairs in December I made another and final visit to China and Japan to get in touch with the latest political and commercial developments before returning home. As I was about to sail for America the fighting began. This took me to Manila again and detained me there until the middle of March of this year, when I came home by the way of Europe and finally reported at Washington for the first time after a continued absence in Asia, and mostly among Asiatics similar to the Filipinos, of over five years. Space is given here and elsewhere to my personal movements in the Philippines and to my experiences in other Asiatic lands in order that the readers of this article may be able to judge for themselves the value of my observations.

IMPARTIAL STATEMENT OF FACTS.

The best way to ascertain the truth regarding any subject where there is a division of opinion is to hear both sides; but before I proceed with this part of my story I would ask that none of it be quoted as my absolute opinion without reference to my reasons for including it in this record. We as a nation are big and strong enough to hear all sides of any issue, and the fairest advocate of any cause is he who can faithfully

state the argument of his opponent without prejudice. The position I have taken as to our duty and responsibilities in the Philippines has been outlined with sufficient clearness to permit me to speak in frank terms of Aguinaldo and his followers without being misunderstood or being classed as his confessor or apologist. One question has been asked of me so many times since my return to America and is so often discussed throughout the country that I shall endeavor to answer it with faithful adherence to facts. It is this: How can the refusal of Aguinaldo to accept our authority and his declaration and continuance of war on us be explained when he and his followers should know that it is for the best interests of himself and his people to acquiesce peacefully in our sovereignty? In other words, What are the influences and events that have developed the strength of the present insurrectionary movement?

AGUINALDO'S DEPARTURE FROM HONG KONG.

Without going into the history of the last revolution in the Philippines, which ended in Aguinaldo and thirty of his associates leaving Manila, I will take up the narrative of his connection with us after I first saw him. About the time I arrived in Hong Kong Aguinaldo came up from Singapore, where he had already discussed the feasibility of his returning to the Philippines with Consul-General Pratt. I will not engage in a discussion of their conferences, because my knowledge thereof is limited to hearsay. In Hong Kong I was introduced to Aguinaldo and most of his advisers by Consul-General Wildman. When the Filipino leader and these lieutenants were taken on board the *McCulloch* in Hong Kong harbor about the middle of May, 1898, I went out in the steam launch that conveyed them to the ship, along with the consul-general and Lieutenant Caldwell, of Admiral Dewey's staff, and heard Aguinaldo make a final statement of his intentions just before embarking for the Philippines.

While I cannot quote his exact language, I remember that with his usual reserved manner he said that it was his intention to proceed to Cavité and, after reporting to Admiral Dewey, go on shore and organize without delay a provisional government and an army with which to join us in making war on the Spaniards and thus secure freedom for his people from Spanish rule. He expressed admiration and love for America and Americans, commended their successes in the war with Spain, and declared that he and his people wished to be our allies. At the moment, in line with general opinion in America and elsewhere, he probably believed that it was not the intention of the United States to hold the islands in actual sovereignty; but I know that he was never given by Admiral Dewey any assurances whatever of independence then or later, nor ever treated by him as an ally in the accepted sense of the term.

After his arrival at Cavité he organized with wonderful rapidity a

provisional government, and in a short time had an army which was capturing Spanish outposts with the frequency of trained regulars. Within thirty days after his arrival he had taken over 2000 Spanish prisoners and had practically gained control of all the country of Luzon outside of Manila, leaving that city to our mercy. During the latter part of May and all of June before the arrival of our troops his relations with our forces were most agreeable. There seemed to be no friction. There was perfect understanding between Admiral Dewey and himself, although the former was careful to avoid formal recognition. No matter what estimate may be made of Aguinaldo's personal character, there is no reason why truthful credit should not be given for what he actually did. Coming to Manila at nearly the same time, I witnessed the beginning as well as the development of his authority. Such able newspaper men as Mr. Stickney, Mr. Harden, Mr. McCutcheon, and Mr. Egan, who also saw what happened then, will confirm my simple statement of facts, as will also Consul Williams.

PEOPLE EXPECTED INDEPENDENCE.

The impression went abroad among the masses of people that Aguinaldo had arrived to establish an independent government and that the Americans would assist him. The actual working of his government under the guns of our ships was sufficient evidence to them of our approval. From one end of Luzon to the other spread the report that Gen. Emilio Aguinaldo, the exiled leader of the former revolution, had returned to his home under the protection of the ships of a nation called America, which had gone to war with Spain and would give them freedom and independence at once. These influences had a tremendous effect. Before Aguinaldo had been in Cavité a month he not only had more soldiers than he could arm, but contributions of large sums of money, with unlimited amounts of rice and other raw food supplies brought in by the people for the support of his army.

From this time on up to February 4, 1899, the people from north to south in the island of Luzon, as well as those in the coast ports of the Visayan group, were educated to believe that they were to have absolute independence. The evidences to the contrary in the meantime became known only to Aguinaldo, his leaders, and certain portions of his army, and were not made known to the people. Here Aguinaldo may have first allowed his personal ambition to outweigh the good of his followers and the masses of population.

Newspapers were started with the special purpose of advancing Filipino interests, and nothing was published in them which suggested other than absolute independence. When the natives, who did not quite understand why we remained so long in the Islands, asked their leaders for an explanation, they were informed that we were making preparations to depart and that it was only a question of time when they would be in full sway in Manila and elsewhere.

THE MALOLOS GOVERNMENT.

The government which was organized by Aguinaldo at Cavité and continued first at Bakor and later at Malolos developed into a much more elaborate affair than its most ardent supporters had originally expected. By the middle of October, 1898, he had assembled at Malolos a congress of 100 men who would compare in behavior, manner, dress and education with the average men of the better classes of other Asiatic nations, possibly including the Japanese. These men, whose sessions I repeatedly attended, conducted themselves with great decorum and showed a knowledge of debate and parliamentary law that would not compare unfavorably with the Japanese Parliament. The executive portion of the government was made up of a ministry of bright men who seemed to understand their respective positions. Each general division was subdivided with reference to practical work. There was a large force of under-secretaries and clerks, who appeared to be kept very busy with routine labor.

A WELL-ORGANIZED ARMY.

The army, however, of Aguinaldo was the marvel of his achievements. He had over 20 regiments of comparatively well-organized, well drilled, and well-dressed soldiers, carrying modern rifles and ammunition. I saw many of these regiments executing not only regimental, but battalion and company drill with a precision that astonished me. Certainly as far as dress was concerned the comparison with the uniform of our soldiers was favorable to the Filipinos. They were officered largely, except in the higher positions, with young men who were ambitious to win honors and were not merely show fighters. The people in all the different towns took great pride in this army. Nearly every family had a father, son, or cousin in it. Wherever they went they roused enthusiasm for the Filipino cause. The impression made upon the inhabitants of the interior by such displays can be readily appreciated. Aguinaldo and his principal lieutenants also made frequent visits to the principal towns and were received with the same earnestness that we show in greeting a successful president.

Along with the army there was a Red Cross association, at the head of which were Aguinaldo's mother and wife. There were quartermaster and commissariat departments which were well equipped, in view of the lack of experience of the men in charge. The American who thinks for a moment that we were or have been fighting a disorganized force labors under great error. It would be difficult to imagine the army of any European country being in better shape to fight us than that of Aguinaldo at the time of the outbreak on February 4, with the conditions of climate and country favoring them.

EFFECT OF THE CAPTURE OF MANILA.

When Manila was occupied on August 13 and Aguinaldo was not

allowed to share the honors of occupation and he was asked to withdraw his forces from the neighborhood of Manila, he advanced the very logical argument that, according to General Merritt's remarkable agreement with General Jaudenes, it was possible that the American forces might withdraw from Manila and leave the Spaniards in possession. And hence he wished to be in a strong position in or about Manila to fight the Spaniards if necessary. This situation gave Aguinaldo a unique strength of argument in his discussions with the American leaders, of which he took full advantage.

When he would say that he could not withdraw far from Manila because the Americans did not themselves know then whether they would remain in possession of the islands, it was impossible for his statement to be refuted. In fact, from a logical standpoint his conclusion was altogether wise, for if we had withdrawn and left the Spaniards in control of Manila, they could have held out until the arrival of reinforcements and prepared themselves to reconquer the islands. Aguinaldo realized this better than any one else, and he did not propose, if he could help it, to be in a position where he could not strike the Spaniards hard and quickly if we withdrew. Possibly and reasonably this explains the fact that he maintained his forces in such strength in the vicinity of Manila for a long time afterward. There were continued negotiations until finally he accepted the ultimatum of General Otis and retired to a position outside of the city and beyond the line of block-houses, where he remained until the outbreak in February.

HARMFUL INFLUENCE OF THE TREATY DELAY.

This leads up to the all-important point of the ratification of the treaty. Here I believe we have the main influence that caused the Filipinos to hold out with such strength and persistency. The failure to ratify the treaty not only gave them time to get their army and government in splendid shape and therefore inspire the people throughout the islands with the idea that they were entirely capable of governing themselves without even our protection, but led them to believe that there was even a strong possibility that they might be compelled to fight Spain again or some other country in their efforts to secure their independence.

EFFECT OF RATIFICATION.

In the informal negotiations between General Otis and Aguinaldo, and in the correspondence which passed between them, the latter took a distinct advantage of the technical point that the United States did not have sovereignty over the islands. Moreover, when discussing the situation with Americans who visited Malolos, Aguinaldo and his cabinet ministers would continually state that they had to keep their army up to full standard in order to be prepared for any eventuality. If the treaty had been ratified immediately after the Senate met in December,

Admiral Dewey and General Otis would have been not only supported by a moral and technical strength of position which the Filipinos could not assail, but they would have had the main part of the dry season ahead of them and fully two months favorable to campaigning. If fighting had followed an early ratification, it probably would have been quickly ended and good government would be now established throughout the islands. If no fighting had followed, which is more probable, viewing all conditions in a comparative light, we would be now congratulating ourselves upon our quick and successful solution of the problems of the Philippines.

I do not wish to appear, in considering this point, as being too optimistic, but when I look back to those trying days at Manila I remember that our leading naval and military officers continually said that every day of delay in treaty ratification meant an incalculable increase of strength in the Filipino ranks.

ANTI-AMERICAN EDUCATION.

It is not generally appreciated in America what a work of education favorable to the Filipinos and against Americans was going on in the country between August 13, 1898, and February 4, 1899. During those six months nearly every man, woman, and child outside of Manila had the opportunity of reading or listening to printed and verbal stories, the special object of which was to teach the masses that the Americans were the worst people on earth, in comparison with whom the Spaniards were saints. These stories described our relations with the Indians in America, magnifying every incident to its fullest degree. Lynchings in the South were portrayed as being the common every-day method of punishing a man, and the Filipinos were taught to believe that as soon as we took possession of the islands we would make them slaves.

Thousands of little pamphlets and circulars were distributed through those sections from which the major portion of Aguinaldo's army was recruited, and each line of their vivid descriptions was read, reread, and discussed in every group of men or women. In this connection it must be remembered that the majority of the Filipino adults who reside in the great populous sections to the north and south of Manila can read and write, and that, according to the statement of reliable members of Aguinaldo's staff, fully 70 per cent. of the men in the ranks of the Filipino army could likewise read and write. The wide-reaching effect of this kind of literature can be better appreciated when it is remembered that up to the time of the battle of May 1 the knowledge that was taught in the Filipino schools did not include to any appreciable extent America and the American people. Aware of what they had suffered at the hands of the Spaniards, the Filipinos were prepared to believe almost anything about us, especially because we remained in the islands when they had been taught to believe by their leaders that we were going away.

These defamatory papers were circulated through three influences: first, that of civil servants of the Spanish Government who lost their positions by American occupation and of Spaniards whose antipathy to us would inspire such action; second, that of a certain element of the Filipino leaders who wished to mislead the people into ardent support of their opposition to American control; and, third, that of agencies in Hong Kong, Madrid, and other places which were in close touch with the Filipino cause and movement. At the same time with the spreading of these false reports, the native Filipino press was indulging in the most exaggerated statements about the advantages and possibilities of absolute independence of government, together with the same class of misrepresentations of America's intentions, even going so far as to say that the European powers were ready to make us withdraw from the islands and in turn recognize the Filipino republic.

THE DISCORDANT NOTES AT HOME.

Following up all these unhappy influences, to which our army and navy had to quietly submit without turning a finger, there came the blow from behind that did more harm than all of these local influences combined—the agitation in America in behalf of the Filipinos and in opposition to the policy of our Government and of the army and navy as advised by such tried men as Admiral Dewey and General Otis. It is remarkable how quickly the idea spread, not only through the Filipino army, but among the people in the distant interior, that the United States was wavering in its policy, and that it was probable that if they held out long enough and persisted in their position we would withdraw our army and give them back the islands.

Every discordant note that was struck in America was telegraphed or written either to Hong Kong or Manila and found its way by first opportunity to the camps of the Filipino army and to the columns of the native press. Not satisfied, however, with the circulation given by the newspapers, what was being said and done in America was printed in circular and pamphlet form and sent among the people to encourage them. If the senior Senator of Massachusetts could have witnessed the expression of satisfaction depicted on the face of every Filipino soldier when he read the sentiments expressed by that distinguished man in the halls of Congress, and then have seen the look of pain upon the face of every American soldier when he realized that a United States Senator was inspiring the enemy opposite him, I am of the humble opinion that he would have experienced some feelings of regret at the direct effect of his argument. There is no question that the belief was prevalent among the Filipinos at the time the fighting began on February 4 that if they held out a sufficient length of time the Americans would give them what they asked. It is not my intention to cast any reflections upon the honesty and good faith of the men who have opposed our policy in the Philippines, and I do not believe that any of them have been actuated

by other than the most patriotic motives, unless, possibly, the natural tendency to make political capital out of the troubles of those in power has inspired some of the criticism or opposition.

I heard not only Admiral Dewey and Major-General Otis, but Generals MacArthur, Anderson, Hale, Lawton, Brigadier-General Otis, and Colonels Smith and Summers use terms as strong as I have on this unhappy feature of the war.

MORAL AND POLITICAL RESPONSIBILITY.

In this article, as in most discussions of the subject, I am avoiding elaborate consideration of the great point of moral and political responsibility in assuming sovereignty over the islands, because that is a subject which can be discussed by every man with equal force whether he has been in the islands or not. Conclusions on this point are largely guided by individual interpretation of the conditions which have developed from the war with Spain. As indicated at the beginning of this paper, I am confining my observations solely to my personal experience.

When we look back over the year that has passed since Admiral Dewey entered Manila Bay, there are possibly many steps taken that might have been directed along different lines if we had had the knowledge that we now have. But viewing the development of events and the natural train of incidents in a fair light, it is very difficult to point out how the present conflict could have been avoided. On the one hand, Aguinaldo's ambition to become the head of a native republic and the determination of his people to follow him is a development such as might have happened in any country under similar conditions. He may be adventurous, but he took advantage of the opportunities which were before him, and in the ways which I have already indicated, he has, until recently, been able to keep most of the people in the immediate vicinity of the ports and of the towns of the large valleys in touch with him. On the other hand, the commanders of the American military and naval forces have conducted their respective campaigns and negotiations along lines consistent with the privileges and rights granted them by the Congress and people of the United States.

INSURRECTION NOT ENTIRELY REPRESENTATIVE.

While the insurrection has been supported by a considerable army, and a large proportion of the inhabitants in the vicinity of Manila, as already pointed out, were for a long time in sympathy with the revolt, yet, viewing the islands as a whole, this movement is not thoroughly representative. The hill tribes of Luzon and the great majority of the people living in the sections far distant from Manila toward the northern and southern ends of the island have been leading a quiet, peaceful life. In the central and populous Visayan group of islands the native population has not been against us. The opposition there to our rule has been confined to the Tagal garrisons that have come down from Luzon. In the

Sulu group and in Mindanao, if we have no special desire or purpose to exploit immediately the interiors of these lands, there is no reason why we should have a conflict on our hands with their native population. The head and front of the revolt is, of course, the Tagalocs, who are supported by natives of the country between Manila and Dagupan and also to the south who are nominally of other tribes, but practically and physically the same as the Tagalocs. The insurgent army is made up of a class of men who are not suited from the lives they have led to hill or mountain work. They are chiefly recruited from Manila and the principal towns to the north and south. Most of them have been brought up to comparatively lazy lives and to have all they wanted to eat. The population, moreover, which is most affected by this war is not the hill element, but that which makes up the great farming and trading portion.

CAMPAIGN IN THE RAINY SEASON.

These considerations are very important in view of the effect of the present rainy season on the combatants. From the conditions now existing, it would seem that the Filipino army and people are going to suffer far more than even the Americans. Many of their chief sources of supply are in our hands; their important markets are cut off from them or likewise in our hands; we have captured many of their stores and accumulated supplies; and now we are in a position to watch the coast so as to prevent them from getting further arms and ammunition. It would seem to me, therefore, entirely rational that the present warfare in the Philippines should be over by the end of the next dry season, which begins in November. With the strengthening of General Otis' force as now planned by the Government and with the vigorous prosecution of the campaign during the rainy season, the insurgents will be so demoralized when the dry season arrives that a few sweeping, decisive movements of flying columns into the interior should effectually destroy all vestiges of the revolt. While it is difficult to campaign in the Philippines at any time, it is possible in the dry season for troops to go anywhere and everywhere and be followed by the commissariat. There is jungle and there are swamps to meet, but they are not impassable after the rains are over. If such brilliant campaigns can be waged as are now going on with the rains prevailing, there is no reason why, when they are over the war should not be quickly ended.

PHILIPPINE RESOURCES AND CLIMATE.

In this discussion I have made no particular reference to the resources of the Philippine Islands. As, naturally, my opinion from extended travel and study in the islands might be desired by some of the readers of the *Review*, I would simply refer to this phase of the subject in a brief statement. I believe that no section of the great continent of Asia or any other portion of the world of similar area still undeveloped offers such wide opportunities for the investment of capital in various enter-

prises, the construction of railroads, the improvement of agricultural conditions, the development of latent mineral deposits, including coal, iron, and gold, and the extension of legitimate commerce and trade. After travelling from one end to the other of Nippon, the principal island of Japan, and comparing what I saw of its resources and conformation of land with what I have seen of the island of Luzon, I can say that in every respect, aside from mere area and population, the comparison is in favor of Luzon.

Judging again from comparative data, after looking at what has been done by the Dutch in Java, by the British in Burmah and the Malay Peninsula, and even by the French in Indo-China, the United States should develop a foreign trade in the Philippine Islands within the next fifteen years of over \$100,000,000. As to the climate, it can be honestly said that it is no worse than that of any other tropical land, and in some respects is much more salubrious; but it must be remembered that the great features which have made the Philippines so rich and resourceful, and hence possibly valuable to us, are their tropical climate and location. Otherwise they would probably be barren and useless or already developed to the same degree as Japan. From long residence in the tropics I am convinced that men can keep as well there as in temperate climates, provided only they take that care of themselves which conditions demand.

TRIBUTE TO ARMY RANK AND FILE.

Before concluding this article I want to take advantage of this opportunity to pay a deserved tribute to the splendid courage and perseverance shown by the rank and file of our army, Regular and volunteer, during the entire campaign and through its most trying conditions. To make a long story short, officers and men could not have fought more valiantly and earnestly. From the start of the fighting until the present there has been a devotion to duty which has even surprised the men themselves. Considering that the war has been carried on in the tropics 10,000 miles away, it would have been excusable if there had been considerable complaint and rankling among a large proportion of the men. Although when not fighting they have argued and discussed in all its phases our occupation of the Philippines, the moment the order for advance against the enemy has been given there has not been a laggard or coward. At the same time that certain men in America were spreading reports that the Oregon, California, and Minnesota regiments were disgruntled and anxious to come home, those same regiments were doing some of the most magnificent fighting of the whole war. Moreover, when the news reached the hospitals that there was fighting out at the front, scores of men in every regiment who were there confined by strict doctors' orders arose from their beds and insisted on going to the firing line. Some day, when the true history of this Philippine campaign is written, the greatest difficulty of the historian will be to pick out individual heroes. There was no lack of heroism in any regiment or com-

pany. If I am accused by any one of painting the quality of our soldiers in too glowing colors, I would ask them if they have gone through all the experiences of campaigning in the tropics. I saw our soldiers and was with them. In the many rough knocks that they get a word of appreciation like this is not only deserved, but truthful.

A FEW FACTS TO BE REMEMBERED.

Lest what I have plainly stated in regard to the development of the Filipino government, the organization of their army, and the general movement of certain sections of the Filipino people against us may be used to draw the conclusion that we have not sufficient reason for our presence in the islands and the adoption of a vigorous policy in establishing sovereignty and prosecuting the war, it must be remembered that, first, the Government of the United States has never in any shape or form recognized the independence or right to act independently of the Filipinos; second, Aguinaldo was distinctly told, both by Admiral Dewey and by General Otis, that the United States could take no steps which would in any way conflict with its position as the Government which had occupied the Philippines as a result of war and which was, therefore, responsible for both the external and internal affairs of the islands; third, legitimate efforts were made by General Otis, through a commission consisting of General Hughes, Colonel Smith, and Colonel Crowder, to reach an understanding with the Filipino leaders long before the outbreak of February 4, but were unavailing; fourth, during the most unfortunate and extended period of friction, while we were waiting for the ratification of the treaty, the Filipino soldiers were undoubtedly more irritating in their methods than were our men, and were even actuated by the idea that our soldiers were cowards, or at least not different from the Spanish soldiers; fifth, an honest effort was all the time made by both General Otis and Admiral Dewey to prevent a conflict, and every one who was at Manila at the time knows that the fight on the night of February 4 was not planned or provoked by our leaders and men, although the first shot was fired by a Nebraska sentry at a Filipino who would not stop when he called "Halt!"

It is possible that fighting might have been prevented, and I believe that our military and naval commanders honestly wished to avoid it. Their efforts failed, fighting began, and now we cannot possibly turn back without shirking our moral responsibility, not only to all the world, but to ourselves and to the natives. Let us hope that the able members of the Philippine commission, President Schurman, Colonel Denby, and Professor Worcester, working in coöperation with General Otis and following the advice which Admiral Dewey must have given them before he left, will be so able to master the situation that when the war is once over they will be in a position to map out a policy and government which will prove that we have successfully met our responsibility.

A SUCCESSFUL CAMPAIGN.

If I were asked what was my direct impression as to the results of our campaign so far, I could faithfully answer that, considering the shortness of time during which we have been operating, the character of the country over which we have had to fight, and the strength and organization of the enemy, which they had perfected through long months of waiting, it has been a thoroughly successful one. People in America, not understanding the conditions, expect too much. When we think that we made practically no campaign outside of Manila until the middle of March, that we have penetrated into the very heart of the enemy's country with a record of continuous successful engagements during the hottest and worst months of the year, it is more fitting that we should congratulate our forces on their splendid record. In view of all conditions, we cannot fairly expect that the end of the conflict should come before the next dry season. Let us be reasonably patient, keeping in mind the work that already has been done, and give our commanders and soldiers that support and confidence which they desire and need. General Otis should be provided with all the soldiers he requires, and the people of the United States should stand by the Government in asking for volunteers if they are needed; but unless unforeseen developments follow, it is probable that General Otis will be able to carry the war to a conclusion with his present regiments recruited to their full limit.

GOVERNMENT THE GREAT PROBLEM.

The government of the Philippine Islands is the great problem which now faces us. If the chief danger of the situation were to be pointed out, I would not say that it would be in the framing of a fair and practical system of administering law and order, but in possibly providing a great field for political appointments. As long as military government lasts this danger is avoided. As soon as we pass from the military to the civil order we will be confronted with the gravest difficulty. If Congress, in determining the laws by which the islands are to be permanently governed, places the principal positions, administrative, judicial, and clerical, in a permanent service where merit, experience, and continuation in the work determine a man's promotion and advancement, the solution of the problem of good government will be soon attained. In the matter of native participation I am a believer that they are capable of a much larger degree of responsibility than that for which they are commonly given credit. When I consider how well, in view of all conditions, the Siamese are governing their little country and are really making decided progress, and when again I see how prosperous the Malay Protected States are, judging from my own personal study of these countries, I do not see any reason why a large proportion of the responsible positions should not be held by the leading Filipinos.

There are a group of capable, educated men, at the head of whom is

Arrelano, who can compare very favorably with a similar group of governing men not only in Siam and in the Malay States, but even in Japan. Associated with Aguinaldo also are a number of men who, never favoring a war policy in dealing with the United States, but following him rather than desert the Filipino cause, will be eventually faithful servants of our Government. The fact that a large number of the Filipinos have fought against us does not mean that they may not possess some qualities of self-government, well guided. This fighting may have rather proved that they have an executive capacity, a power of organization, and a persistency of effort for which otherwise we would probably never have given them credit. We must remember also the actual government that existed at Malolos. While in many respects the Filipino management of their affairs reminded one of a child with a new toy, yet every observer, military, naval, or civilian, who went to Malolos or who in the earlier days saw the development of government at Cavité and Bakor, was impressed with the apparent order, system, and formality with which everything was done. These are qualities that count in organizing government. There were at the same time numerous tendencies to display, superficial consideration, and insincerity of action that showed the necessity of a steady hand in order to get at the true essence of government.

NEGOTIATIONS FOR SURRENDER.

There is no doubt but what in all the negotiations before the outbreak our military representatives were extremely hampered by the rather exalted position taken by the Filipino leaders with whom they had to confer, and that the latter indulged in demands and arguments that were not consistent with what they had a right to expect under the circumstances. With the negotiations which must follow unconditional surrender, it is probable that these same leaders will be found as tractable as they were once unreasoning. This reference to unconditional surrender, however, leads me to make one observation which may in a measure explain the refusal of Aguinaldo and many of his chief officers to yield. They remember the experiences of the past with Spain. The memories of Filipino leaders who were shot or exiled for life after being promised full freedom and liberty in the event of surrender are still fresh. It would not be in the least remarkable if this were the main-spring of Aguinaldo's holding out in the face of all the recent reverses. Knowing that he is the central figure of the war on the Filipino side, he probably fears that surrender on his part will mean not only the end of all glory and influence for him, but possibly death. On this basis he may argue that it is better to fight on until he is killed in battle. Using still his great personal influence, he may be able, therefore, to prolong the conflict until he himself is captured or shot.

In a discussion of this kind it is impossible to give fair and complete consideration of all the points that come rushing into the thoughts of

one who has been a personal student of the operations described and who wishes to give an accurate account and impression. There are many phases of the relations of the Americans and Filipinos which, if carefully explained, would throw much new light on the history of our political and military experience in the islands. I hope that what I have been able to include in this article may assist in the general effort to get at the truth of the situation. As suggested in the opening paragraphs of this discussion, I do not claim infallibility, but I know that I have faithfully striven to put into accurate terms what it was my experience to see and learn in our new possessions.

THE TRUE STORY OF ST. CLOUD.

(From Army and Navy Gazette, London.)

A STRANGER who visits the ruins of the beautiful Palace of St. Cloud will be told by his French guide that the palace was set on fire and burned by the Germans, and he will presently see, as he inspects the building, the words "*Incendié par les Prussiens*" inscribed on its blackened walls. If the traveller be well advised that statement will be cheerfully accepted by him. The story is not true, but it will live. A day or two after the destruction of the palace a gentleman, who was at the Crown Prince's headquarters in Versailles, wrote to a friend who was with the Prussians at Sèvres, for an account of the fire, and received the following narrative in reply, written on cards embossed with the Imperial arms, surrounded with "*Maison de l'Empereur. Service du Grand Chambellan,*" at the top, and engraved "*Par Ordre de l'Empereur. Le Chambellan de Service a l'honneur de prévenir M—— qu'——est invité à Diner au Palais de —— le —— à heures.*" They came from the débris of the office which were strewn about the place:

VILLE D'AVRAY, Monday 17, 1870.

DEAR SIR,—Thanks for your note, which I received midnight Thursday. It was honored in right imperial style, perused by the light of St. Cloud in flames.

Am I wrong in assuming that the last days of St. Cloud possess an historical interest? If so, your humble servant seems called upon to be the historian. Fate so ordained it that I should be the only civilian of any nationality in St. Cloud at 2.30 on Thursday when the shell crashed through the roof that set it in flames beyond redemption. At headquarters you can learn that the second company 5th Battalion Silesian Jägers (whose guest I am and shall continue to be through all eventualities) established their quarters in St. Cloud about mid-day on

Tuesday. We marched there through such a shell fire that you, perhaps, might have described but I cannot. Especial reason have I to remember that awful march. Horses being scarce my friend, Captain Von Strantz, had kindly provided me with a donkey to carry my few impedimenta. That donkey was like to be my ruin. Our course first lay through Sèvres, where all was quiet enough. We marched through it slowly, but, gaining the summit of an unwooded hill, my companions hurried on, why, at the time, I could not tell. They shouted and beckoned for me to follow. Amongst my other impedimenta I bore an African spear or assegai, belonging to Lieutenant De St. Paul of ours. With this I pricked and lashed my lazy beast away from the bald hill, thank God, into a wood, through which our course lay. Barely had I entered the wood when the French opened fire from Mont St. Valerien with 10 in. shells. At the first shot my donkey came to a stand and began to bray. Hastily dismounting, I sought shelter of the nearest tree trunk, around which for one mortal hour by the clock I dodged to avoid as best I might the splinters that roared and hissed, and moaned and hummed on every side of me. At length the iron storm lulled, when, profiting by the occasion, I ran out of the wood into the palace, where our Jägers were ensconced in the lower rooms. An artillery lieutenant told me that forty-five 10 in. shells had entered and burst in the palace. One of the first crashed through the imperial bed. That of the Empress, next chamber, still remained intact. Two shells had gone through the Artillery Observation Look-out whilst the lieutenant was below taking orders. More than 200 10 in. shells had been launched altogether in about one hour. Having the run of the entire palace, still it was deemed expedient to take up our quarters as near the base as possible. Captain Von Strantz, 1st Lieutenant Von Bissing, 2d Lieutenant de St. Paul, and I spread our mattresses in a corner basement room. Wednesday passed most uncomfortably. Shells were no longer fired, but outside the palace was a barricade over which Chassepôt bullets were continually flying. Not until Thursday morning did I venture to wander through the palace, and right glad am I to have seen its loveliness even in desolation. The wreck of porcelain, beds, clocks, furniture, statues, I cannot describe. Captain Von Strantz had given me permission to collect as much as I chose. About two o'clock as we sat at dinner we heard a crash so near that it disturbed us. "The palace burns!" announced a sentry. Leaving our champagne we went out. Sure enough flames lapped the upper story. At once, a fire engine was brought into play. Useless; the flames had taken too fast a hold. Estimating probabilities, I wrote a despatch, sent it to the Field Post, then back to our champagne. "Gentlemen," said Captain Von Strantz solemnly, "I am the last commandant of St. Cloud! Pass we all into the grand chambers, there to take a last glance and a souvenir! Take what you will," said the captain to me, "vases, pictures, books, anything!" With Lieutenant Von Bissing and Major Von Clop I went.

Seeing that I took nothing for myself those fine fellows again pressed me to do so. "My position amongst you gentlemen is delicate," said I, "Nothing will I take that is not offered to me." Then you should have seen. On all sides from many hands came presents of such beautiful things as could hardly have been imagined. Alas, flames and smoke were gaining! Timbers were crashing, the palace chambers a fiery labyrinth! The most valuable booty I was obliged to relinquish, nevertheless I have secured some. Passing out on the sward there was a sight! Acres upon acres of vases, clocks, furniture, lighted up by bivouac fires. Soldiers wrapped in red, yellow, blue, and gold-bedecked silken window curtains flitted about like imps in a pantomime. One fellow had wrapped himself in the Emperor's silken counterpane, another ate boiled potatoes from a Sèvres tureen, marked with Imperial symbols. About two-thirds of the library were saved—from the fire that is to say—but rain setting in they were somewhat damaged. The rest of that night, imagine if you can, describe it I cannot. Friday dawned upon us, all wet through. It still rained, but sitting down I endeavored to pen a line. In vain, the rain blurred my pencil strokes. "Come with me," said an artillery officer, "I'll find you a room to write in, but you mustn't mind the shells." So I took possession of my room in a house about 100 yards nearer the trench lines, wrote many letters all day, and slept there Friday night, but not tranquilly. About three A. M. a shell bursting broke my windows, and scattered my floor with glass. Getting out to see what was up a piece of this glass entered my foot, so I may call myself wounded. One incident of Thursday night I forgot to state. Our Jägers, who are funny fellows, conceived the idea of making me bombproof, so they wound me round and round with, I should think, some hundred yards of curtain fringe, some of it bullion. Lying down in this coat of mail my chest was so constricted that I could not breathe; I became seriously alarmed, and had to be undressed, a matter of some 15 minutes. This is an outline; more I will tell if you carry out your threat of coming to see me. I am, as police reports state, "*a mauvais sujet*, without fixed abode."

The writer, Dr. Scoffern, was a German domiciled in England, to which he returned after the war. He was a man of considerable learning, of great simplicity, and of singular modesty and bravery. Sir W. H. Russell, who sent us the original cards described above, knew him as a brother journalist, though he cannot remember for what paper Dr. Scoffern wrote, but no man could have had more thorough personal experiences of the march to Paris and of the siege, for Dr. Scoffern trudged on foot with his beloved Jägers every inch of the way from the frontier to Paris, and in return for the hospitality and shelter Captain Von Strantz, who early in the war won the 1st Class of the Iron Cross, afforded him, the doctor healed the sick and attended to the wounded, gaining the goodwill and gratitude of the whole battalion. He was a chemist of much merit, and invented, if we mistake not, an explosive

of great power, which some of our readers may remember. He died in London, we think, about 1876 or 1877.

And that was how the Palace of St. Cloud was burned—not by the Prussians, but by French shells from Valerien.

LEGENDS OF MT. WRANGEL.

TALES INDIANS TELL OF THE MOUNTAIN OF MYSTERY.

(From New York Sun.)

DEEP in the almost impenetrable centre of Alaska Mount Wrangel rears its lofty height, an unexplored peak. From the time when Baron Wrangel sighted the smoke-capped crown of the volcano and gave it his name down to the present many white men have viewed the summit from a distance, and some few have tried to attain the mountain and all but perished in the attempt. None has ever set foot upon even the lowest slope of the vast acclivity which stretches up into the clouds and is not improbably the highest mountain on this continent. In the language of the Taral Indians, who live in the nearest habitable part of Alaska, there is an ancient word for the peak, which is said to mean "Mountain of Mystery," and they have invested it with weird terrors, which make of it a veritable Brocken of the North.

It is probable that the superstitious awe in which the mountain is held by the Indians is, like most other Alaskan superstitions, of ancient origin, but it has not decreased with the passage of the years. The latest travellers in that region, R. S. Condon and George Divelbliss, who on May 3 went up the Kotsina River and ascended a mountain just across a narrow valley from the mysterious volcano, and much nearer to it than any point which other white men had ever attained before, were warned by the friendly Tarals, whom they had left fifty miles away, that if they attempted to approach the Mountain of Mystery they would be devoured by fearful monsters which guarded it from intrusion by human beings.

"Many years ago," said they, "when our fathers' fathers were little children, a party of hunters of our tribe went to the mountain in search of game, for on the further slope there is a wonderful green country abounding in all sorts of game, as our tribe has known for many centuries. But the party never came back, nor was any trace of them found, and it was then known that they had been devoured by the monstrous fire-breathing beasts that inhabit the caves in the sides of the mountain. Since then a few of the bravest hunters of the tribe have made their way to the mountain, but all have perished there."

Undaunted by this relation the two Americans kept on their way and had a good view of the mountain, which they saw to be quite barren of

vegetation, even the valley below it being desolate and dead, a drear stretch of solidified lava. The crater, about half a mile in diameter, was smoking, but was not throwing out any fire or lava. Down on the slope were thirteen vent holes, which cast up steaming water to a height of several hundred feet in regular pulsations. These geysers, for such they seemed to be, may well be the prototypes of the monsters of Indian legend. On their return, which was hastened because of lack of food, the explorers met other Indians who received with open doubt the account of the nature of the mountain, but declined to hold much discussion of the matter, alleging that it was dangerous even to talk about that dread region. Despite this cautious spirit the Indian tongue has loosened up at intervals and the Alaskan newspapers have printed from time to time bits of Indian folklore, among which are to be found a few curious legends of the Mountain of Mystery. Presumably these exist to-day much as they were handed down from long ago, as the lore of aboriginal peoples is transmitted from generation to generation with an accuracy which in most cases would shame the printed page. One of the earliest of these legends, and the one, it would appear, to which Messrs. Condon and Divilbliss's Taral friends referred, is as follows:

In a year of great scarcity of food the fathers of the tribe remembered that there was a tradition to the effect that in case of famine, when food was to be found nowhere, the greatest hunters of the tribe should go to the Mountain of Mystery and hunt on the further side, where lay a fair country rich in game, but guarded by savage monsters and spirits of the waste, which must be avoided or overcome before the fertile region could be reached. Accordingly a dozen chosen hunters set forth fully armed and equipped, bearing the blessings of the tribe. It was agreed that when they reached the summit of the mountain they were to make a signal, for which the tribe, on the nearest peak to which it dared go, would watch. On the third day, the time set for the arrival of the bold hunters on the peak, a great cloud of black smoke was seen to rise from the summit of the volcano followed by a stupendous belch of flame, and the air was filled with a dreadful roaring and the earth trembled and shook so that many of the tribe, terrified out of their senses, rushed down the lookout mountain and, falling over cliffs and into crevasses, were killed. For three days the roaring and trembling of the ground continued, showing the wrath of the mountain spirits against the tribe which had impiously attempted to force a way into the secret places. What horrible fate the hunters met could only be conjectured by their friends, for there was no sign or trace of them from that day forth.

All the tales of Mount Wrangel are of this general type, but some go more into detail and of these the following is a good specimen. It was told to a traveller through an interpreter by a Taral Indian who had come down to the coast several years ago:

"In the days when my father was a boy and just learning to cast a spear, there was a great witch doctor in the tribe named Tas-kah-yeh,

who was more powerful and feared than the chief himself. For this reason the chief was jealous of him, and when a sickness fell upon many of the tribe he laid the blame of it upon the witch doctor and banished him to the smoking mountain to bring back from the devils and spirits that guard it a cure for the sickness. So Tas-kah-yeh went forth declaring that by his mysterious powers he would come back unharmed and with stores of wisdom, and would learn the fate of those of the tribe who, many years before, had gone to the mountain for game and never returned. With him went his pupil, Sha-koo, who desired knowledge greatly that he might in time succeed to the honors of his master. It was arranged that he should stand on the summit of a mountain near the Mountain of Mystery and there watch his master make the ascent.

"If the evil spirits prevail over me," said Tas-kah-yeh to him, "do you return to the tribe and tell them the things which you have seen for a warning to others who may in the future attempt to enter this region; for if I, with all my wisdom, cannot preserve myself from these agencies, then no man can come hither and live."

"Accordingly the young man stationed himself at a point where he could see all that passed, and presently beheld his master emerge into the valley of lava below. More swiftly than any mere man could run he traversed the broken surface, and soon was speeding up the gradual slope of the mountain. Stride after stride, each covering ten spears' lengths, he took, and nothing rose up to oppose him; but Sha-koo heard with terror a deep, hollow roar come from the bowels of the volcano. Then, directly in the path of the climber, there leaped from out the side of the acclivity a hissing serpent that towered a mile in the air, giving forth a thick vapor from all its length. To the right and to the left sprang up other serpents, and the sound of their hissing was so terrific that the watcher on the further mountain, buried his head in his arms. When he looked up he saw Tas-kah-yeh, grown to gigantic proportions by his magic, strike down serpent after serpent with great rocks which he tore from the side of the mountain and heard him shout with a mighty voice:

"Do not fear. I have conquered the spirits of the mountain and destroyed them."

"Then up he went and was met by a monstrous beast like a bear, but taller than the highest tree and with three heads, who rose from out a vast crevice in the volcano. With this beast the magician grappled and strangled him, casting his body clear across the valley to the side of the next mountain, where the imprint may be seen yet. Again he shouted to his pupil in exultation. But as he leaped the abyss from which the animal had arisen and strode toward the fire-hole of the mountain, there was a roar like that of a thousand cataracts, and the spirit of the mountain, a creature of living flame, leaped forth from the opening, flung itself upon the intruder and utterly consumed him. In his death agony the magician uttered a shriek so terrible that it swept all the trees from the nearby mountains, and none has ever grown there

since. That is the tale which the pupil, Sha-koo, who afterward became witch-doctor of the tribe, brought back with him."

This legend suggests plainly the geysers and an eruption of the volcano, though it is not known that it has been in eruption for many years. Similar is a tale told by a tribe of Indians near the coast of three of their number who wandered into the interior. Of these three only one returned. He was broken in body and spirit, and what was left of his hair had turned almost white, though he was a young man. Some wandering Indians found him in the vicinity of the Copper River, and by their help he succeeded in making his way to the coast, where he died soon afterward. According to his story he and his two companions were in search of game near the headwaters of a river (probably the Kotsina), and leaving the river struck across a range of small mountains, one of the men declaring that there was a fine hunting country on the other side. When they reached the top of this range they found themselves looking across a narrow valley at the highest mountain any of them had ever seen, from the top of which rolled great volumes of dense black smoke. Immediately they became possessed of an irresistible desire to ascend the mountain and warm themselves at the smoking mouth. They descended into a desolate valley and began the ascent of the mountain, upon which no living thing grew. It was not a difficult ascent, as the slope was gradual and the footing fairly good, but after they had climbed several hours they were overtaken by a snowstorm in which they lost their way. The relator of the tale found a shelter between two lava formations, where he remained while his companions went forward and disappeared in the curtain of snow. Suddenly the snowfall ceased, and the Indian, looking above, saw his two companions surrounded by a score of monstrous beings which whirled aloft in the air further than the eye could reach, giving forth a terrific hissing and roaring with vapors. He could see the two terrified men rushing hither and thither in their efforts to avoid the monsters, but they were presently snatched up, shot aloft and torn to pieces. At this dreadful sight the watcher was possessed of an insane impulse to rush forward to the fate which his companions had just met. Strive as he might against it, it proved too strong to be overcome, and he leaped from his shelter and rushed up the slope with such vehemence that he fell into a lava crevice and lost his senses. When he recovered, the madness was gone, and there remained in its place only an overpowering terror, which never left him to the time of his death. He fled down the mountain, and wandered for days before being picked up by the tribe of local Indians.

The legend of the irresistible attraction of the volcano is paralleled in other bits of Alaskan folklore which ascribes to other volcanic peaks spirits of the mountain who lure human beings to their destruction. In the Aleutian Islands, many of which are volcanic, there are a number of cases, apparently well authenticated, in which Indians have rushed to

the craters of volcanoes and thrown themselves in without known motive for suicide. This would seem to indicate some powerful influence of a volcano over the savage mind. The same thing has been related, by the way, of the natives of the Hawaiian Islands. No other mountain in Alaska is regarded with such awe as Mount Wrangel, a strange fact in view of its extreme inaccessibility and the activity of various other volcanic peaks. The most widespread legend about it is that which tells of the guardianship of gigantic animals, who devour all intruders. The greatest of these creatures is said to be a huge white bear, who inhabits the crater and lives on flames, and issues forth with terrible roarings only when the privacy of his retreat is threatened. He is the presiding genius of the mountain, and the geyser spirits are his minions. So thoroughly imbued with terror of the mountain are the natives now, that it is unlikely that they will again attempt to find the fabulous hunting grounds on the further side. If the mysterious mount is ever explored it will be by white men.

Whoever undertakes the exploration will do so at the peril of his life from the very real guardian monsters of cold and starvation. In 1885, Lieut. Allen, U. S. A., went up the Copper River and got within forty miles of the peak, but could go no further. In 1890, a party led by E. H. Wells, of Cincinnati, came down from the Yukon River to the north and got within about forty miles of Mount Wrangel, but were forced to turn back from want of food, and almost died of want before they were picked up by a band of Indians. The description given by Messrs. Condon and Divilbliss—who, by the way, were not looking for the mountain, but were prospecting, and found many traces of gold and copper, the latter extremely rich—does not hold out alluring prospects. They say that there was not a trace of vegetation on the mountain, or even in the valley around it; not so much as a bush, though it was summer when they were there. The mountain itself was a mass of ice, snow and hardened lava. The geysers and the exuding masses of smoke were the only signs of activity. They found no traces of game and only a few signs of mountain sheep, though the Indians told them that the place was infested with bears of great ferocity and size. Their testimony, together with that of the explorers who have approached the mountain from the other side, is sufficient to show that it lies in a dead region, and that the Taral tradition of a fertile slope is pure legend.

SIR EVELYN WOOD ON WAR CORRESPONDENTS.

SPEAKING as principal guest at a dinner of the Authors' Club the other evening, General Sir Evelyn Wood paid a high tribute to war correspondents and their work. Sir Evelyn referred to a gathering he recently attended at Kidderminster, when a distinguished electrician who was present said, "the man who caused all this trouble

in South Africa is sitting at this table," and he pointed to Sir James Sivewright. One of the party asked why that was so, and the reply given was "Because Evelyn Wood employed him to cut off all connection for fourteen days, and he refused to do it." He (Sir Evelyn Wood) had been asked on more than one occasion to write in the columns of a popular magazine the name of the bravest man he had ever seen. He had declined to do so once, twice, or thrice, because happily, he had known so many brave men, and space would prevent them being included in any columns, save in those of the British army. War correspondents had shown that they were as intrepid as they were able, brave and conscientious. Those men, whether they liked them or disliked them, were worthy of the highest admiration. Some commanders liked soldier correspondents. He had seen them often, but he was certain that civilians, being able to write with greater impartiality, were of more advantage to the army and to the public whom they served. He was therefore, altogether in favor of civilians being exclusively employed as correspondents. He believed in showing trust and confidence in those men who in honor and courage could not be surpassed. If a man erred, either by inadvertence or ignorance, the first time he would warn him, and the second time he would send him away; but he had known many correspondents, and he could not believe that there would be many instances which would require such drastic treatment. It was far better for the soldier that the Press should employ educated and intelligent men, who, being free to go everywhere, could exercise a balanced judgment in comparing different accounts, and become the medium between the soldier who was fighting the battle abroad and the paymasters at home, the people he served, and who had a right to know the truth. He believed implicitly in every man being allowed to speak according to his own lights and his own experience, and in trusting men who carried their lives, as they did their pens, in their hands. They might be sure that the interests of the service would not permanently suffer by any occasional errors of intelligent and accurate observers, and they, as soldiers, owed a debt of gratitude to those who could interest the masses of their countrymen in the sacrifices they were making abroad, which, in many cases, was the only reward they got, though, indeed, there could be no better reward than national sympathy.—*United Service Gazette*.

PARTICIPATION DE L'ARMÉE AUX CONCOURS HIPPIQUES.

LA date du 4 juillet 1899, le Ministre de la guerre a signé la circulaire suivante :

"Mon cher Général, j'ai l'honneur de porter à votre connaissance les conditions auxquelles les officiers de toutes armes peuvent être autorisés à prendre part aux concours hippiques.

“ 1^o En aucun cas, les prix ne consisteront en des sommes d'argent ;

“ 2^o Les épreuves dites ‘ militaires ’ ne seront disputées que par des officiers en activité de service, montant en uniforme des chevaux d'armes d'officiers.

“ Toutefois, les officiers pourront prendre part en tenue civile aux épreuves réservées aux gentlemen, mais seulement avec des chevaux non inscrits sur les contrôles de l'armée et à la condition expresse que leur qualité d'officier ne sera pas mentionné au programme.

“ Je me réserve, pour chaque concours, de désigner les corps d'armée dont les officiers pourront être admis à y prendre part.

“ Les autorisations individuelles seront accordées par les chefs de corps, sous leur responsabilité personnelle ; ils ne devront laisser concourir que des officiers habiles et vigoureux cavaliers se présentant dans une tenue strictement correcte, avec des chevaux honorables, complètement préparés et d'une franchise absolue aux obstacles.

“ A cette occasion, je crois utile de rappeler les dispositions ci-après de la circulaire du 16 juin 1894 qu'il importe de ne pas perdre de vue :

“ Les généraux et chefs de corps ont le devoir de limiter dans une sage proportion les permissions et autorisations accordées aux officiers pour participer aux concours hippiques et aux courses, et de les refuser absolument, dès que le service de ces officiers, leur zèle ou leur esprit militaire semblent pouvoir en être atteints. ’

“ La présente circulaire n'est pas applicable aux sous-officiers ; il leur est interdit de prendre part à aucun concours hippique.

“ Les sociétés qui désirent obtenir la participation des officiers aux concours qu'elles organisent devront me faire parvenir leurs programmes deux mois au moins avant la date à laquelle elles en ont fixé l'ouverture.

“ J'ai l'honneur de vous prier de vouloir bien faire porter ces dispositions à la connaissance des sociétés hippiques dont le siège est situé sur le territoire de votre commandement et engager ces sociétés à m'adresser leurs programmes par votre intermédiaire, afin que ceux-ci me parviennent accompagnés de vos observations s'il y a lieu.

“ GALLIFET. ”

—*Revue du Cercle Militaire.*

Military Notes.

MEDALS OF HONOR.

IT is stated in a General Order from the War Department that the President intends to recommend to Congress the giving of medals of honor to the volunteer regiments who remained in service after their terms of duty had expired. Is it possible that such a thing as this is of more importance than the battles around Santiago, which gave to the country the whole island of Cuba, and indirectly the Philippine Islands as well as Porto Rico? While we do not begrudge the volunteers anything the Government can do for them to recognize their services, yet we do think the country owes something to the men who freely shed their blood on the San Juan hills.

SECRETARY OF WAR.

Mr. Alger, the United States Secretary for War, tendered his resignation, to take effect at the wish of the President, and it was accepted to take effect July 31, 1899. Mr. Elihu Root, a prominent and well-known New York lawyer, has been appointed to succeed him.

MORE SURGEONS NEEDED AT MANILA.

Surgeon Woodhull, at Manila, is reported to have stated that the increased military forces in the Philippine Islands will necessitate the employment of forty additional surgeons, but his recommendation to that effect has been disapproved by General Otis. There are nearly three thousand soldiers in the hospitals at Manila, San Fernando and elsewhere. There are also two hundred and seventy-five sick in quarters in Manila.—*Medical Record*.

SURGICAL HINTS.

(1) Whenever you suspect the presence of severe internal injuries, never allow the patient to get up and go about very soon. It is always of great importance to secure as long a period of rest and quiet as possible.

(2) In bony ankylosis there is no pain in voluntary efforts of motion; in fibrous ankylosis there is. In the first, if the physician tries passive motion, the pain is only where his fingers compress the part; in the latter there is pain all over the joint.

(3) In any of the forms of chronic superficial inflammation of the

tongue it is unwise to use caustics. These agents commonly increase the irritation, such cases showing marked tendencies toward malignant development, and must always be carefully watched.

(4) Never treat a severe burn on the flexor part of the joint without applying an appropriate splint to prevent as much as possible the occurrence of contraction. The need of skin grafting is especially great in all burns where the result of contraction would be deformity or disability.

(5) In dislocations at the shoulder joint, a rapid test consists in applying a straight ruler to the acromion process of the scapula and the external condyle of the humerus. If it touches both joints at the same time there is dislocation, for normally the deltoid prominence prevents this.

(6) In young people complaining of pains and swelling in the neighborhood of a joint, especially about the long bones, examine very carefully to see whether the trouble is in the joint. If it affects the bone itself, the chances are in favor of malignant rather than arthritic trouble. If malignant the development is usually rapid. There are usually glandular enlargements. The tumor is uneven in density, the superficial veins increase fast, and the pain is more or less constant and of a shooting nature.

(7) To remove blood from the hands use soap only after washing in plain water.

(8) Sweeping and dusting should not be done just before an operation. Cover possible dust collections with wet sheets.

(9) In amputations loose muscles retract more than those attached to bone. Hence sever the loose muscles first, so that the ends may be of equal length.

(10) If the wound is clean leave it alone; the best surgeons apply but one dressing.

(11) Wash out the nasal passages before giving ether to subjects of catarrh.

(12) Scalp wounds, if large, should be stitched, but stitches should be removed early.

(13) In felon, find out if the bone is attacked. Amputation of the terminal phalanx is best delayed until the septic process is overcome.

(14) In frost bite do not amputate early. Use thorough asepsis, and maintain the patient's strength.—*International Journal of Surgery*.

PIGEON POST.

A regimental pigeon post is henceforth to form part of the regular equipment of every Russian field force when mobilized. Experiments with the birds were conducted on a fairly extensive scale during the last army manoeuvres at Novo-Georgievsk, and the utility of the birds amply demonstrated. The pigeons accompanied the advanced guards and out-

posts, and were sent with messages to headquarters, ten and even twenty miles back. In no case, it is stated, did the pigeons fail to arrive with their intelligence far more quickly than any mounted messenger could have come.—*Army and Navy Gazette*.

MEDAL OF HONOR.

The President of the French Republic has intimated that "all Frenchmen, civil or military, having taken part in the operations directed by MM. Liotard and Marchand in Central Africa will receive, if they do not already possess it, the colonial medal. This medal, for all, will have attached a gold clasp on which will be engraved the inscription 'De l'Atlantique à la mer Rouge.'"—*Army and Navy Gazette*.

THE TREATMENT OF WOUNDED FILIPINOS.

Prof. Dean C. Worcester, of the Philippine Commission, has been investigating into the truth of the charges of barbarity on the part of American soldiers which have been widely disseminated throughout this country by means of letters from soldiers in the field. Mr. Worcester, after a careful probing of the matter, finds that these charges are "in the main grossly exaggerated and in some cases absolutely false." Referring to the story of a man who is reported to have said that "we bombarded a place called Malabon and then went in and killed every native we met—men, women, and children," Professor Worcester states that not only were no natives massacred, but that Malabon was never even bombarded, for the very excellent reason that it was abandoned by the natives before the approach of the United States troops. He goes on to say: "I have personally inspected all battle-fields from Caloocan to Malolos. Once I was on the field before the wounded were removed, and repeatedly I was there before the dead were buried. I never saw a single woman or child wounded or dead. I have found, on the contrary, wounded rebels whose injuries have been dressed by American surgeons before the firing had ceased, and who had also been provided with food and water. The insurgent wounded were brought to Manila and tended in our hospitals or even taken care of in private hospitals, the Government paying all expenses. When cured the wounded can hardly be driven away. All the prisoners are well fed and treated, and many say that they are glad they have had the experience and learned to know the Americans. The released prisoners and the recovered wounded are our best missionaries, but many of them are unwilling to return to their own people." This emphatic testimony given by an unbiassed and upright witness should go far to counteract the false evidence which is for an unworthy purpose published in some American papers. The fact should also not be lost sight of that the publication in our journals of alleged atrocities are copied by the insurgent press, tending to prolong the war and to cause further misery and distress. It is not the insur-

gents alone that suffer, but, in the words of Professor Worcester, they cost good American lives.—*Medical Record*.

NEW FORTIFICATIONS NAMED.—HONORS PAID TO THE MEMORY OF OFFICERS OF THE ARMY AND THE NAVY.

The War Department has given names to the new batteries recently constructed along the sea-coasts of the United States as follows:

Battery at Long Island Head, Boston Harbor, named *Fort Strong*, in honor of the late Major-Gen. George C. Strong, U. S. V., war of 1861-65.

Battery at Grover's Cliff, Boston Harbor, named *Fort Banks*, in honor of the late Major-Gen. Nathaniel P. Banks, U. S. V., war of 1861-65.

Battery at Plum Island, Long Island, N. Y., named *Fort Terry*, in honor of the late Major-Gen. Alfred H. Terry, U. S. A.

Battery at Delaware City, Del., named *Fort Dupont*, in honor of the late Rear Admiral Samuel F. Dupont, U. S. N.

Battery at Santa Rosa Island, Fla., named *Fort Pensacola*.

Battery at Ballast Point, San Diego, Cal., named *Fort Rosecrans*, in honor of the late Major-Gen. William S. Rosecrans, U. S. V., Brigadier-Gen. U. S. A.

Battery at Chinook Point, mouth of Columbia River, named *Fort Columbia*.

Battery at Admiralty Head, Puget Sound, named *Fort Casey*, in honor of the late Brig.-Gen. Thomas L. Casey, Chief of Engineers, U. S. A.

Batteries at Fort Caswell, N. C., constituting the defense of the mouth of Cape Fear River and of Wilmington, N. C.: Twelve-inch battery, named *Battery Caswell*; on the site of old Fort Caswell, which fort is believed to have been named in honor of Richard Caswell, a distinguished member of the Continental Congress, an officer of the Revolutionary Army and first Governor of the State of North Carolina. Eight-inch battery, named *Battery Swift*, in honor of the late Capt. Alexander J. Swift, Corps of Engineers, who was employed upon the construction of Fort Caswell, and who died of disease contracted in the field during the Mexican War. Five-inch battery, named *Battery Shipp*, in honor of the late First Lieut. William E. Shipp, Tenth Cavalry, killed at the battle of San Juan, Cuba.

Battery at Hawkins Point, Md., named *Fort Armistead*, in honor of the late Major Armistead, Corps of Artillery, brevetted Lieutenant-Colonel for gallant conduct while in command of Fort McHenry, Baltimore, in the successful defense of that post against the attack of the British fleet under Admiral Cochrane on September 13 and 14, 1814, and whose steadfast bravery on this occasion saved the city of Baltimore from capture, and was the inspiration of Francis Scott Key in the composition of the patriotic words of our national air, "The Star Spangled Banner."

The mortar battery on Sullivan's Island, S. C., is to be known as *Battery Capron* instead of Fort Capron.

Battery at Marrowstone Point, Puget Sound, to be named *Fort Flagler*, in honor of the late Brig.-Gen. D. W. Flagler, Chief of Ordnance, U. S. Army.

Battery at Great Gull Island, opposite New London, Conn., to be named *Fort Michie*, in honor of the late 1st Lieut. D. M. Michie, 17th U. S. Inf., killed in action at San Juan, Santiago, Cuba, July 1, 1898.

Mortar Battery at Fort Caswell, N. C., to be named *Battery Bagley*, in honor of the late Ensign Worth Bagley, U. S. Navy, of North Carolina, killed in action at Cardenas, Cuba, May 11, 1898.

THE EFFECTS OF MODERN SMALL-ARM PROJECTILES AS SHOWN BY THE
WOUNDED OF THE FIFTH CORPS.

This paper was read by Dr. Charles B. Nancrede, of Ann Arbor, Mich. Reports showed that about fourteen hundred wounded were cared for at the hospital with which he was connected, for nearly all of the injured in this corps who survived for twenty-four hours sooner or later passed through their hands, so that flesh wounds and those of a day to a week or more were observed. Flesh wounds were always of a trivial nature, unless the ball became deformed by striking some extraneous object, or when stripping its mantle, as it sometimes did. This immunity enjoyed by the flesh wounds caused by Mauser and Krag balls resulted, first, from the slight amount of contusion caused by the rapidly moving ball; second, the aseptic condition of the ball; third, the rarity of the carriage of fragments of clothing into the wound, as was not uncommonly done by the 43-calibre Remington, brass-mantled balls. If they were kept aseptic, the majority of flesh wounds healed almost as if they had been incised wounds, not uncommonly cicatrizing under the primary field dressing made with the first-aid package. Contusions, or slight wounds of the great vessels leading to so-called traumatic aneurisms, or aseptic or septic sloughing of the vessels many days after the receipt of the wound, were far from uncommon. Thus, he saw one wounded subclavian artery when the patient survived over three weeks, to succumb finally to hemorrhage during an attempt to ligate the vessel, which was torn for a long distance. He also knew of another patient dying on the table some weeks after being wounded, during an attempt to secure the same vessel. He tied the common femoral for wounds and assisted a colleague in securing another, days after the receipt of the injury. He tied one radial for secondary hemorrhage and ordered the tying of an ulnar for ball injury, several days after their division, and was compelled to amputate an arm after failing to secure a bleeding brachial in an apparently aseptic wound, two weeks after the man had been shot. The greatest advance in military surgery on the battle-field in recent times was the first-aid packet, and the greatest boons conferred on the wounded soldier had been asepsis and antiseptis, because in the majority of instances they rendered his injuries so

painless and their complications so slight, that even anæsthetics no longer occupied the chief place as a blessing to the wounded, because they were comparatively rarely needed. Antiseptic occlusion also proved the best treatment for most of the thoracic, abdominal, and articular injuries. All patients with perforating ball wounds of the abdomen, who were operated upon, he was informed, perished, while a number he saw recovered without intervention, antiseptic occlusion being relied upon. Wounds of the liver and kidneys did not seem to give rise to dangerous infection in the small number treated. If section could not be done before peritoneal infection had become well established, both civil and military surgeons had long believed that, poor as are the chances of recovery, they were lessened rather than increased by the operation.—*Medical Record*.

THE TWO POINTS OF VIEW.

While critics on this side of the Atlantic are showing that our army at Santiago ought not to have won, the Spanish military commanders on duty then are explaining that our operations were so conducted that it was absolutely impossible to make head against us. The difference is between the theory of war and its actual practice. In the text-books the result of battles is a matter of nice calculation and exact prevision. In the field it is chiefly a matter of good fortune or the product of conditions largely independent of the orderly and systematic conduct of the campaign as laid down in the books. The question of what Napoleon had for dinner was on more than one occasion an important factor in his failure or success. It was the treachery of a German pastor which furnished Napoleon information which led to the victory of Jena; and so on through the chapter of good or evil fortune resulting in defeat or victory. It is true, in a special sense of war, that "nothing succeeds like success."

Before the Spanish court-martial General Blanco said that he had never advised surrender at Santiago. He was always in favor of resistance, but the government approved the American proposals without discussion. When he telegraphed to General Toral, these proposals had already been accepted. He believed that there was not a sufficiently strong garrison at Santiago.

* General Pareja said that his troops were terribly short of food and several soldiers had died of starvation. General Toral said it was impossible to resist the Americans and Generals Iscarío and Rubi hold the same opinion. General Ordonnez thought that capitulation might have been avoided by rushing through our lines. General Pando said that when he gave up the command at Santiago there was plenty of ammunition there, but not enough artillery. He did not agree with the decision of the Generals at Havana and wanted reinforcements sent to Santiago.—*Army and Navy Journal*.

Reviews and Exchanges.

Hygiene in the Tropics.*

THERE are so many errors in Prof. Notter's article that it is difficult to believe that he has been correctly quoted. Some of these errors are those of the books—traditions—and are to be expected. Luckily, none of them alter the general conclusions to which he comes as to the proper methods of managing epidemics in the tropics, and while his paper will be generally accepted and concurred in, yet the misconceptions in minor details may lead to serious sanitary mistakes on the part of our soldiers in their private life. Hence it is a positive necessity to call attention to these, and the best way to do this is to quote sentences here and there and point out their errors.

He states, "that all diseases, however trivial elsewhere, become serious in the tropics." "A prolonged residence in a hot climate undoubtedly deteriorates the system." "The energy of the Anglo-Saxon who has been long resident in the tropics suffers." * * * "There is increased activity in any acute fever due to the diminished resistant power of the individual." He mentions the fact of "the quicker onset of effects of age on the private soldier after 30." These are all facts, but when he begins to speculate he forgets the facts and says, "The immunity afforded by residence appears to be much more perfect in tropical and subtropical regions than in higher latitudes. The protection acquired through acclimatization cannot be denied." Nothing could be more untrue, because the very opposite is true. Protection through acclimatization *can* be positively denied. English medical journals in India say so, and they ought to know better than English physicians at home. Lessened death rate in India is due to increased knowledge and skill in avoiding the causes of death, and does not prove that we can resist them better. Indeed every single fact shows conclusively that the longer a white man lives in the tropics, the less able is he to resist tropical diseases, but the more skillful he becomes in dodging them. To suppose otherwise would be as foolish as to suppose that the longer we lived in the arctic regions the harder it would be to freeze to death.

In regard to clothing he says, "flannel is immeasurably superior to cotton stuffs." This error is what has been taught us, and until we went to the tropics it was what we always believed. Experience shows that cotton has to be used. When we discuss clothing we always refer to the fact that whenever a lower animal needs clothing it always grows wool. It would have been wiser to say that in the tropics animals need no clothing at all and are mostly naked or nearly so, and it would be foolish for man to wear any clothes either. The real facts are explained when we know the difference between wool and vegetable fibres. The latter fibre is composed of long microscopic rods enclosing

* *Sanitary Methods of Dealing with Epidemics.* By Professor J. Lane Notter, M. A., M. D. From Professional Papers of the Corps of Royal Engineers. JOURNAL MILITARY SERVICE INSTITUTION, July, 1899, p. 111.

spaces which by capillary attraction suck up water with remarkable rapidity, and just as easily give it up to dry air. The woolen fibre, on the contrary, is a long rod built up of epidermal scales, precisely like fish scales; there are no long spaces, and they absorb water very slowly, do not pack together when wet, do not conduct heat, therefore, and do not allow the water (perspiration) in them to be easily evaporated. Now if there is anything necessary in a cool, bracing or changeable climate, it is to prevent a too rapid cooling off when we are heated or perspiring. If clothed in vegetable fibres the perspiration is allowed to soak through, evaporate and carry away immense quantities of body heat. (To evaporate an ounce of perspiration requires as much heat from our bodies as would raise 540 ounces of water one degree in temperature, centigrade.) Hence, cooling off rapidly reduces the body heat below safe limits, vital processes are checked, blood driven within too suddenly, there are local congestions, and we become too weakened to resist the bacteria we constantly carry with us. The result is an infection such as pneumonia. Consequently we see in all variable climates that the natives wear thick woolen shirts, no matter how hot the summer. The peculiar thing is that we presumed when we went to the tropics we still had to prevent ourselves from chilling, in spite of the fact that no one can cool off day or night no matter how hard he tries. He cannot radiate heat to hotter bodies, the air is too saturated already to take up his perspiration and he stews and is never cool, but always overheated even in health. How foolish then to wear flannel to keep in more heat still, and to prevent a chill when many a man would give \$5 for every chill he could get.

As little clothing as possible is the rule and that clothing should be such as to interfere in no way whatever with getting rid of our surplus heat. We are in less danger of chills than of being devoured by polar bears. Cottons and linens are universal, the color should be white to reflect external heat, but in the field light yellowish to brown, to be inconspicuous, and not show dirt so soon.

The following is an editorial in the *New York Medical Journal* of July 22, 1899, "The Relation of the Soldier's Dress to Heat Apoplexy."

"Lieutenant-Colonel McCartie, of the Indian Medical Staff, contributes to the *Indian Medical Gazette* for June a most interesting communication on The Cause and Prevention of Heat Apoplexy in the Army, and one which will have special force for us in regard to our troops now serving in the tropics.

"Colonel McCartie first combats, and we think satisfactorily, Dr. Sambon's views, published over a year ago in the *British Medical Journal*, that 'heat apoplexy' is not caused by heat, but is an infective disease. He points out that soldiers and civilians work under such different conditions as to dress as to account fully for the prevalence of the disease among soldiers, while civilians working under a higher temperature are almost exempt. The latter wear a thin twill cotton shirt, loose cotton trousers, cool socks, cool light shoes, a light gossamer coat, worn open, and a thick pith hat, coming down the neck, and carry a thick umbrella; while the soldier wears clothing unnecessarily warm and so buttoned up and strapped down that the air cannot circulate about his body, the evaporation of the perspiration cannot go on, and thus Nature's heat-regulating mechanism is thrown out of gear. The consequences are distress, fatigue, exhaustion, fever, and heat apoplexy!

"Colonel McCartie's observations are based upon considerable experience, especially during the hot-weather campaigns of 1895 and 1897. He noticed

that most of the men attacked by heat apoplexy were very warmly clad, most of them wearing flannel shirts, and many even thick woolen undershirts as well.

"One piece of evidence recorded is very striking. In a frontier campaign in 1897 sufficient coolies could not be obtained, and part of the baggage had to be carried by native soldiers in plain clothes. Before the end of the march, says Colonel McCartie, nearly all the men in the ranks were utterly exhausted, and some of them had heat apoplexy, while their comrades doing duty as bearers and carrying a much heavier weight, but dressed in their own loose, light, rational dress, were not the least distressed.

"Colonel McCartie condemns the belts and straps which go over the coat as the worst part of the soldier's dress, and advises doing away with them all. He recommends a loose Norfolk jacket with four pockets, loose trousers with two pockets in front and two behind, and a loose twill cotton shirt with two pockets. To these might, if necessary, be added a light knapsack capable of carrying the contents of the haversack and the greater part of the ammunition. A hook could be fastened in the jacket for the water bottle, and a frog attached for the bayonet.

"The accommodation afforded by the pockets would do away with the necessity for belts, straps, and pouches; while, on the march, the knapsack would accommodate all the ammunition and food needed.

"To sum up, the rational attire for soldiers serving in tropical climates would be light, loosely-made garments of very porous material; and an entire absence of straps, belts, pouches, etc. The soldier is not dressed in parade order for fatigue duty, and campaigning is fatigue duty in the highest degree."—[*New York Medical Journal*.]

"The more nearly the diet is assimilated to the natives of the country in the substitution of fruits and farinaceous substances for oleagenous articles the less will be the liability to disordered digestion." This is perfect nonsense and dangerous advice. We should not try to live like natives anywhere, because natives always eat what they can get, not what they ought to have. Men in Alaska are dying of scurvy and exhaustion because they are eating like Eskimos, and in the tropics, if we eat like natives, we will become as stupid, frail and worthless as they are, and that is the real reason why diseases are so severe in the tropics—the white man is exhausted by idleness and insufficient food and has no resistance.

"A large proportion of the digestive mortality in the tropics results from the habitual ingestion of a larger quantity of food—and that of a rich, stimulating character—than the system requires." Though this is old, old teaching, there is not a particle of evidence to support it; indeed the discoveries of the last twenty years have shown that diseases we once thought to be due to lack of food are all due to bacterial infection, and experience shows that the well fed are far more able to resist bacteria when they do invade than the feeble and half starved.

"In barracks and cantonments let animal food be in part substituted by vegetable." More old absurd teaching. Experience shows that tropical heat causes a great expenditure of nervous and muscular force which results in an almost universal neurasthenia, or nervous exhaustion in the tropics, among whites. Nitrogenous animal foods are just the ones which must be increased to supply the wastes and help to prevent exhaustion.

"A man who systematically drinks will most assuredly break down sooner

or later. But this is not an argument for total abstinence." As everybody drinks whiskey in the tropics it is just as absurd to say that alcohol in moderation is the cause of deaths as it is to affirm that as every man who died was found to wear cotton socks—therefore cotton socks are deadly. Experience shows that a moderate amount of alcohol in the tropics is a necessity, and that the total abstainers and drunkards are both doing wrong.

"Light red wines, well diluted with water, * * * may act as a preservative against cholera and bowel complaints." This is only true in the sense that they keep up our strength and vitality. Diluted Scotch whiskey is the universal drink and is probably better than light red wines.

Speaking of good filters, he states that, "For their action they require water pressure, and the process is slow but effective." This needs emphasis. Most filters are merely clarifiers, because bacteria are so small that they will freely go through them. In order to keep them out, the pores of the filters must be so small that water cannot be forced through except by great pressure. This is rarely recognized, and we see great danger in it. It can be taken as an axiom that if a filter works easily without high water pressure it is worthless and dangerous as giving a false sense of security. It is better by far to depend on boiling.

"Cholera ever attacks the intemperate first; it has a preference for alcoholic drinkers." This means, of course, not those who drink in moderation, but the heavy drinkers.

Speaking of yellow fever, he says that "the natives, creoles and acclimatized immigrants enjoy an exemption from it more or less complete." This is not correct. The yellow fever commission some years ago proved conclusively that there is no such immunity, and that every native who seems to have escaped has really had yellow fever in childhood. In creole families even after several generations of residence there is still a frightful mortality from the disease; and every new fact coming to light shows that they never become so acclimatized as to be immune, but on the other hand become more susceptible.

"Emanations from the localities containing the yellow fever poison are, during the night, rapidly diffused upwards, and may be carried to a considerable distance by air current." The truth is the very opposite, the germ is very heavy and sticks to solids, and is not carried far by air currents; and herein lies the safety of communities by isolation of patients. Records show that when a case is introduced into a city, the deaths are all within a radius of a few hundred feet of this cause.

When he says that "The [yellow fever] poison has been generated in the crowded, filthy and unventilated holds of slave ships," he violates the very foundation of all biology. The germs are *never* generated by any conditions we can impose. Every case arises from a pre-existing case. What he meant to say, was that the germ being introduced by one man into such crowded, confined quarters, very easily spread to the others.

CHAS. E. WOODRUFF,

Capt. and Asst. Surgeon, U. S. Army.

Reminiscences of the Santiago Campaign.*

Amid the numerous historic and other books published on the Spanish

* *Reminiscences of the Santiago Campaign.* By Capt. John Bigelow, Jr., 10th U. S. Cavalry. Harper Bros. New York. 1899.

War, there has never been anything like that furnished by Captain Bigelow. It is the true story of the soldier, and bears evidence of its truthfulness in the care taken to preserve orders and other data. It is replete with incident and shows not only the trials of an officer, but all the hardships which a soldier necessarily has to endure during war. The author says in his preface: "They make no pretension to be a history of the late war, nor even of the 'Campaign of Santiago,' but simply what the title implies—a narration of what an officer participating in that campaign saw, felt, and thought, with such explanations and suggestions as his observations and reflections prompted."

Captain Bigelow makes some excellent points, for instance, he says: "The Government will doubtless take good care that our costly battle-ships are not left to the handling of militia or volunteer captains, but it thinks nothing of intrusting the lives of hundreds and thousands of soldiers to the veriest tyros in land warfare."

We must confess that we started to look over the book with reluctance, not only because of our personal experience in the Santiago campaign, but on account of the many newspaper and magazine articles and books published on the subject; but as we turned over page after page, our interest grew deeper as we progressed, and was maintained throughout the work. It should be a popular book in the country and ought to be read by every officer in the service.

Referring to the subject of rations, the author says: "Rations were issued very irregularly. We might on the same day receive two days' coffee, one day's bread and three days' bacon. Sometimes we received only the fraction of a day's allowance of one or more of the components of our short ration, such as half a day's sugar. * * * The men did not on an average get the full allowance even of coffee, bread, bacon or canned beef, and what they got did not go as far as it ordinarily would, because of the wastage due to individual cooking. It was impossible to cook for the troop collectively, as we had no kettles or other cooking utensils. * * * I have vague, indistinct recollections of complaints about the beef, but did not take the trouble to investigate them. I disliked the beef myself, and I had no reason to suppose that the men liked it any better than I did, and I was morally certain that no good would come from my complaining about it. I once had an experience as a complainant to the War Department which I did not care to have repeated."

No officer or man knows anything more about a battle than what comes under his individual observation, and it is from these accounts that histories are made. Captain Bigelow modestly relates his experience and tells only of what his eyes saw and his ears heard, and the story is simply that of one officer, but will entertain any one who has an interest in military matters. P.

The Automatic Instructor.*

This little book gives a concise but complete description of a method of acquiring a perfect knowledge of any text-book or other book used in pursuing a special course of study or reading.

Some years ago the discoverer of the system, in preparing for a competitive examination, found it impossible to make satisfactory progress by ordinary methods of study. He was greatly troubled by mind-wandering and defective memory. The use of this system at once removed all difficulties and he was

* *The Automatic Instructor*. Adapted for the use of Officers in Preparing for Examination. By Capt. G. W. Read, U. S. A. Hudson-Kimberly Publishing Co., Kansas City, Mo.

able to prepare so thoroughly for the examination that he was successful over many competitors and secured a much-coveted appointment.

The system is so simple that it can be applied at once by any one who is able to read and write. It will be of great value to all who are troubled with mind-wandering or weak memory.

General principles of the system. Every practical system for learning a book is based on the following fundamental principles: (a) The mind must be concentrated upon what is read. (b) An analysis must be made, separating the essential from the immaterial. (c) The impression produced by the essential must be strong enough to cause the mind to retain it, or the original impression must be sufficiently strengthened.

These three principles may be summarized in the three words: Concentration, Analysis, Retention.

Concentration is a device perfectly simple, yet so effective that the attention is riveted to the lesson without effort on the part of the student.

The Analysis describes the method of separating the essential from its surroundings; in other words a mental, brief or abstract must be made of that which the mind must retain; and retention describes the way by which each repetition can be made to deepen the original mental impression materially.

A great advantage of this system is the ease with which one can work for hours without loss of attention or interest. Its use absolutely prevents mind-wandering.

Notes on the Supply of an Army During Active Operations.*

This work clearly shows the great improvements which have been introduced into the art of supplying troops in the field, due to the numerous innovations in the methods and means of land transportation in the last thirty-five years, and particularly to the development of the Science of Statistics. It also clearly shows the necessity for the establishment of a Staff School whereat officers of our supply departments could be given a thorough course of instruction in the various methods of supplying an army in the field, and would be made familiar with the literature of the special branch of their profession. If such a school had been established, we would long ere this have drawn useful lessons from the methods employed in supplying the armies during our Civil War, and would certainly have prepared Regulations setting forth the precise duties of the various supply officers for an army in the field.

Regimental Recruiting.†

This work is compiled from Orders and Regulations generally patterned after Cir. 7, A. G. O. 1892. "Regimental Recruiting" gives concisely the principal duties of a Special Regimental Recruiting Officer; the forms of vouchers for rent, lodging, etc.; and gives the different reports and returns required by the Staff Departments. It will be a great aid to those detailed on Regimental Recruiting and who have not had the opportunity to keep posted on the duties pertaining thereto. It will also be a convenient hand-book for those who have had experience on this duty.

* *Notes on the Supply of an Army During Active Operations.* By O. Espanet, Sous-Intendant Militaire de 2e Classe. Translated by Capt. H. F. Kendall, 8th Cavalry. Also, *The Art of Supplying Armies in the Field as Exemplified During the Civil War.* By Capt. Henry G. Sharpe, Subsistence Department. Prize Essay from THE JOURNAL OF THE MILITARY SERVICE INSTITUTION of the United States, January, 1896. Hudson-Kimberly Publishing Co., Kansas City, Mo.

† *Regimental Recruiting.* By First Lieut. F. S. Armstrong, First Cavalry. Hudson-Kimberly Publishing Co., Kansas City, Mo.

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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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THE PLACE OF THE FEMALE NURSE IN THE ARMY.

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THE employment of female nurses with the army in our late war with Spain reached a magnitude and importance that for a time threatened us with a new military passion and the creation of a new worship. Working under a settled military system dominated by a severe economy of expenditure, and applied to small commands upon a peace footing, there had been no necessity for the employment of female nurses in our post hospitals of twelve or twenty-four beds, nor any occasion to suggest its ultimate propriety. With the exception of the Army and Navy General Hospital at Hot Springs, Ark., we had no hospital of that designation, and the small hospitals at posts could not contemplate the subdivision of construction necessary to accommodate female nurses, nor by so much weaken the field strength and efficiency of their detachments of the hospital corps when these were called out by field practice or campaign emergency. Such quotas ranged from three or four privates in a garrison of one company to nine in a post of regimental size containing twelve companies, there being a sliding scale for intermediate strength. The non-commissioned officers varied from one to three. From these small organizations great proficiency was required in the per-

formance of their varied medical and military duties, and much care was necessary in their constant training, the product being, in competent hands, a compact body of individuals fitted for hospital work in its special branches, but equally trained as soldiers for the medical exigencies of the field. It is quite plain from this simple preliminary statement of numbers and occupation that there was and could be nothing extravagant in this medical provision, and nothing superfluous; that in fact the scheme was necessarily one of nice adjustment in the strictest military sense, and admitted of no indulgence of sentiment or for small margins of estimated gain.

The collective designation of this force was Hospital Corps, a theoretical unit of widely separated but instructed fragments, having, unfortunately, chance and scant opportunity for assembling in camps of practice for concerted action, and wanting even the cohesion impressed by the knowledge of a scheme for ultimate unification in time of war; but, nevertheless, a workmanlike military body to whose fidelity and efficiency I am glad to offer this casual tribute. The disability specified was not a fault of their education, but purely military and imposed by the conditions of the army at large, affecting war efficiency, but creating no new necessity nor obligation in the medical life of posts, nor suggesting any change of medical personnel for the routine work of our domesticated garrisons.

Upon this tranquil and unpretentious scene burst the inundation of war.

Without discussing what this meant for the general military establishment, for the Medical Department it invoked the instant consideration of problems of organization and equipment, some of which had remained without settlement since the close of the Civil War in 1865; while others sprang fresh from the soil of the new conflict. Among the latter was the employment of female nurses, the conditions constituting a necessity for this assistance, and the limitations of their sphere of work. No one, in this day and this country, needs to be told of the multiplication and growth of the training schools for women entering upon serious hospital work, or the like general employment, of the gracious benefaction of such service, and of the new humanity that has entered the doors of the sick. No one requires

to be told of the courage, endurance, and constancy of these women. These qualities and values were not for a moment in question, but their transfer to the active military conditions of an army in the field constituted a problem for careful and temperate argument.

Medical service in time of war begins with the regiment and expands through the successive organizations of the ambulance companies and division hospitals, the transport by road, rail, or water, to the general hospitals at selected and fixed points connected with the base. It has, therefore, in general terms, a strictly military and easily movable front, more or less constant lines of supply and evacuation, and well-determined and elaborate depots for the sick in the general hospitals.

Obviously and without more detail of exposition this simple statement would seem to define at once the admissible limit of woman's work, as a military nurse, to the security of the general hospital, with possible admission to such transport, rail or water, as might provide safety and comparative freedom from exhausting exposure. This restriction of nursing service to the general hospital was already known to exist in all foreign military service, even where its importance was admitted, and was familiar within our own history, and there was no adequate reason for supposing a war with Spain would develop conditions for a more extended employment.

The plain objectives for the employment of the army, subject to the preliminary control of the sea, were Cuba and Porto Rico; for the Philippines had not yet risen above the horizon of opportunity. The war, therefore, was to be purely one of invasion, and the preparations were to be made within our own borders, and undisturbed. The formal declaration of war was made April 21, 1898, the force immediately available for mobilization being the Regular army numbering 2143 officers and 26,040 men, a total of 28,183, then engaged in various administration, and distributed as to the combatant force among eighty posts, from Maine to California, and from St. Paul to New Orleans. With these scattered troops was serving, in small groups as stated, a hospital corps of seven hundred and ninety-one non-commissioned officers and men, or five hundred and ninety-two privates, one hundred acting hospital stewards and

ninety-nine hospital stewards. Of this medical force eighteen stewards, twenty-five acting stewards, and two hundred and seven privates, a total of two hundred and fifty, accompanied their commands into the field, the remainder being either detained at the posts from which troops were wholly or partially withdrawn, for the care of the sick and property unavoidably left behind; or reserved to provide a skilled nucleus for the general hospitals to be rapidly organized, for assignment to the hospital boats and trains, and at the sub depots of supply. Perhaps nothing will illustrate, so well and briefly, the poverty and painful insufficiency of the medical force thus immediately available upon call, as the statement that had the whole of it, two hundred and fifty men, been assigned to duty with the Fifth Army Corps, 17,000 strong, when it left Tampa for Santiago, representing the mobilized Regular army, this medical provision would still have lacked more than four hundred men of the proper quota for the service of that command under any active military condition whatever.

We have few spare parts in the army, and in its medical service none. Every one is continuously in use. The hospital detachments are kept, numerically, at their lowest effective, and emergencies are met by temporary transfers from other stations. Not many years ago a small force of these men was collected for important service against Indians, and this incipient hospital corps company of 21 men came from nearly as many different posts. Medical officers are allotted in the same sparing way. This system has the advantage of being apparently economical, but it does not recognize war, which is incredibly obstinate and exacts preparation. This exaction overtook us speedily in this instance, so that there was an immediate default, as to the hospital corps, when commands were severed from their sedentary posts, and the shortage had to be filled by ordinary recruitment, retarded by volunteer competition. It is not necessary to insist that you cannot obtain large numbers of men of special aptitude and training in this way, no matter what the occasion and effort may be, so that the natural result of an increasing demand for men for medical service, to meet not only existing and present needs, but to maintain any adequate relation to the army then expanding rapidly to its

authorized strength of 61,000 men, was to accumulate much that was incompetent and undesirable, as well as much that was intelligent and serviceable, although untaught. That notable work was accomplished by medical officers with this personnel, hastily organized, is justly creditable to both.

But a far more difficult problem confronted the medical management of the large volunteer force of 200,000 men. The regiments full of local affinities, but without military traditions or adjustments, were not even supplied, as in the National Guard, with a regimental medical service more or less crude, but which they could understand. Legislation had not provided for this nor for any larger medical unit, nor for any general medical force out of which these units could be fashioned; and when the necessity for these came, and it came quickly, the quotas for the Division hospital, and for the ambulance companies, had to be supplied by the wholesale transfer of such regimental detachments as had been formed, and large levies from the regiments themselves. Evidently this was not, and could not be a disciplined, efficient, and coherent medical assistance. It was not even numerically adequate, was gathered slowly and with difficulty, and without pretence of aptitude.

Had the sickness and casualties to be dealt with come within the estimated ineffective for an ordinary campaign, it is doubtful if this defective and improvised machinery could have done the work; but under any stress failure was inevitable. The sanitary history of the summer of 1898 is, no doubt, in some degree, familiar to most, though probably not clear to many, public excitement and unwarranted irritation having dealt freely with theory, facts and figures.

The sick rates for the months of May and June showed no marked excess over a reasonable ineffective, 2.5 to 3 per cent., and it was not until the latter half of July that there was any frank declaration of an impending wide-spread infection of typhoid fever in the various camps. The increase was one of rapid acceleration, until there could be no mistake as to the magnitude of the impending disaster. The proofs were exact and cumulative, and the Division hospitals whose proper military function is to receive the sick from regiments for more deliberate observation than can be given there, for the better care

afforded by better means, and for the disposal of their sick with reasonable rapidity, these intermediate asylums were distended and overwhelmed within a few weeks by tens, scores, and hundreds of cases of typhoid fever, losing all their mobility at once, and becoming fixed or general hospitals in essence and fact, involuntarily and without any formality of decree. It is a question whether, if foreseen, this perversion of the normal office of the Division hospital could have been prevented, and again it is a question, as applied to all such cases, whether once these provisional beds have been filled by such a serious disorder, it is not a wiser policy to control and dispose of the epidemic on the spot, than to force a rapid evacuation to general hospitals elsewhere. This, however, is aside from our consideration. For the month of June, out of a mean strength for the army of 159,793, the whole number of admissions to sick report was 24,339, with 112 deaths. In July the admissions had risen to 41,664, with 437 deaths, out of a mean strength of 203,350; and finally the climax is reached in August with 53,705 admissions and 776 deaths, out of a mean strength of 190,347. After this there was a diminished force, and owing to most effective sanitation a rapidly falling admission and death rate. For the same months the admissions for typhoid fever alone were 414, 3041, and 6172, the deaths being respectively 14, 167, 353. This is the general exhibit.

The extent to which the camp hospitals, regimental, and field or Division, were immobilized by the dead weight of this single cause is shown in the table on opposite page, taken from the report of the Commission of Investigation, p. 73. The period is not given.

The general hospitals, of the last column, belonged to these camps, but were differentiated from the field hospitals for administrative purposes.

The instructive figures in this table are those of Camps Alger, Meade, Thomas, and that at Jacksonville. Considering the first two together, as dealing with the same command continuously as to time, the typhoid admissions were, for Alger and Meade, 1609; for Thomas, 1380, and for Jacksonville, 1742. This is impressive but it is not all, because there were many other admissions to the hospitals in these camps, for

diarrhœa and dysentery, for malarial disorders, venereal disease, and for injuries, large groups not as sharply outlined as was the epidemic of typhoid fever, and overshadowed by it, while preponderating largely as to numbers and increasing the congestion.

STATISTICS OF TYPHOID FEVER IN CERTAIN CAMPS AND DISTRICTS.

CAMP OR DISTRICT.	Regimental Hospitals.		Field Hospitals.		General Hospitals.	
	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
Camp Wikoff	85	1	24		552	105
Camp Meade.....	956	43	1347	31		
Camp Alger.....	653	11	80		450	57
Camp Thomas.....	1380	79	1094	74	952	113
Camp Tampa, Fla.....	55	1	212	18	1193	65
Camp Jacksonville, Fla.....	1742	13	1825	227		
Camp Santiago, Cuba.....	58	2	116	3	68	
Porto Rico.....	204	4	343	25	381	34
Total.....	5133	154	5041	378	3596	374

The following tables showing what a procession of sick choked some of these Division hospitals will illustrate the most conspicuous records.

FIRST DIVISION HOSPITAL, SECOND ARMY CORPS.

DATE, 1896.	Remaining.	Admitted.	Total.	Deaths.
June.....	44	482	526	2
July.....	99	586	685	2
August.....	110	1011	1121	13
September.....	215	935	1150	4
		3014		

SECOND DIVISION HOSPITAL, THIRD ARMY CORPS.

DATE, 1898.	Remaining.	Admitted.	Total.	Deaths.
June.....	—	430	430	2
July.....	—	904	904	6
August.....	279	1118	1397	16
September.....	78	37	115	3
		2489		

SECOND DIVISION HOSPITAL, SEVENTH ARMY CORPS.

DATE, 1898.	Remaining.	Admitted.	Total.	Deaths.
June.....	6	391	397	1
July.....	117	569	686	13
August.....	252	988	1240	42
September.....	560	965	1525	76
		2913		

This is an aggregate of 8416 admissions within four months, and principally in the months of July, August, and September.

These figures show at once how these simple camp hospitals, fitted originally for two hundred beds, but at times gradually enlarged to twice that size, intended to be freely movable, and mere intermediaries, or clearances for the Division, were paralyzed by distention, and had to work out their salvation in these unwonted fetters. Had the commands to which they were attached been intended for immediate or near aggression, had they not become, whatever their original intention, merely troops collected for organization, equipment and instruction, equally transferable to this or that unit, the medical situation would have been bitterly absurd in any military sense, as indeed it was little short of being as an instructive lesson in war. For instance, it would be difficult to assume or cite, except as to the host of Sennacherib, a more unwieldy medical condition than existed in the Second Army Corps, upon its removal from Camp Alger, through Thoroughfare Gap, to Camp Meade, the Division hospitals being immovable, and only fragments of the personnel and material available for transfer to the new station. And it is easy to conceive of a repetition of this process, for at no time thereafter were the Division hospitals of this corps able to take the field with their commands, in spite of a free evacuation into the neighboring civil hospitals which solicited the transfer of patients. Nor was this a singular instance.

All this is not the story of the failure of the Medical Department to do properly that it was intended to do, and to work effectively with its tools, but in a way it is the story of the failure of the frog to become an ox suddenly, a failure to im-

provisé means, aptitude, discipline, and organization. Incidentally it is also the story of the advent of the female nurse.

But before meeting this new auxiliary, let me say briefly, that nowhere in military annals is there a more instructive and supreme vindication of the value of training, of the tenacity that is inseparable from discipline and secure knowledge, or a greater justification of the old appeal for distinct field organization and a definition of duty, than, once adjusted for war, has come out of the slow but sure emergence of the Medical Department of the army from the smother of the unprecedented conditions, military and civil, of the past year. And this irrespective of the sharp sanitary lessons enforced.

It is idle to claim here or elsewhere that the value of the employment of the trained female nurse in the army was a revelation. Women were employed as nurses in some of the hospitals of our own Revolution. We have had glimpses of her since the days of the Crimea and the hospitals at Scutari. She was known, though not an organized or instructed force, in the War of the Rebellion. She has been long established at some permanent military hospitals, such as Netley, in England; and she is a fairly familiar object at our own military posts among the sick of officers' families. She is recognized, respected and welcome everywhere in this country, though making her way more slowly abroad. But civil employment, in a home or in a hospital, affords many facilities, and many safeguards that our military hospitals lack, and which they cannot provide without greatly increased cost of construction, and a larger personnel. We had done remarkably well with our hospital detachments, and hoped for better things if we could secure a training school, and a nucleus for our hospital corps companies. In the matter of results we could compare favorably with civil hospitals dealing with a like number of adult males, and our statistics for the previous year, in such a test as typhoid fever, 159 cases with 9 deaths, offered no reproach.

In short, and as I have said before, there was nothing in our assured, if somewhat restricted military life, that suggested other aid than we had, though we wished that perfected for its special work. There will be those who do not sympathize with this acquiescence, are impatient with such slow progress, and

would enter impetuously where the instructed hesitate. Then, too, the gift of an after prophecy is almost universal. Therefore, it is not strange that the Surgeon General of the army was wastefully criticised for resolutely waiting for two things, proof that the large commands collected were not intended immediately or in the near future for active operations, and evidence that the field hospitals attached to these commands were crippled so that their functions were destroyed.

These conditions were not satisfied before the middle of July, when the installation of women in the most urgent field hospitals began, proceeding rapidly. This was the logical result of the premises already admitted. It was sane and orderly administration. No other trained force for such work could be had, and none existed. The first such detachment, four, was supplied to the General Hospital at Key West on May 10th, the number generally assigned reaching 50 by July 1st; 162 by July 31st; 362 August 15; 924 August 31st, and 1158 by September 15th. The whole history of the movement is, however, better given in the table on opposite page than by any lengthened description. It is the report of female contract nurses made by the able Superintendent of that service, to the Committee of Investigation.

On March 15, of this year, the number still under contract was 343, of which 145 were in the United States, 100 in Cuba, 44 in Porto Rico, 28 in Manila, 18 in Honolulu, and 8 on the Hospital Steamer *Relief*. By August 1st, this number had been further reduced to 200. Fourteen of these women have died, either at their posts of duty, or elsewhere, as the result of exposure and infection.

I have given this table and the later figures in full, both because they are better than any narrative, and to give this subject the fullest possible notice and hearing, as well as the strongest argument with which it can be credited. The record is entirely creditable to a large class of earnest, intelligent, and devoted women, much of it is heroic in the best sense of the word, and it is American. No other nation would have attempted such an effort, nor would it have been possible elsewhere to have selected for an emergency such a corps from a membership of 5000 trained women. The few blemishes of which there are

CONTRACT NURSES U. S. ARMY, 1898.

HOSPITALS.	May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
	15	31	15	30	15	31	15	31	15	30	15	31	15	30	15	31
Key West, Fla.....	4	4	4	9	0	6	0	0	0	0	0	0	0	0	0	0
Hospital Ship Relief.....	2	8	8	6	8	8	8	8	8	9	8	8	8	8	8	9
Chickamauga, Ga. (Leiter Gen. Hos.).....		6	6	21	31	40	40	33	30	0	62	59	57	54	44	44
Atlanta, Ga. (Fr. McPherson Gen. Hos.).....			5	11	15	16	51	52	50	42	45	58	62	54	55	48
Fort Myer, Va. (Gen. Hos.).....						76	88	76	50	43	39	47	35	33	32	30
Santiago de Cuba (various hos. 5th Crps.).....						8	23	30	48	40	30	18	15	7	9	8
Fort Monroe, Va. (Gen. Hosp.).....						1	12	3	3	0	0	0	0	0	0	0
Tampa, Fla. (Hospitals 4th Crps.).....						23	166	117	109	70	12	0	0	0	0	0
Chickamauga Ga. (Sternberg Gen. Hos.).....						2	2	0	0	0	0	0	0	0	0	0
Sheridan Point, Va.....						30	35	42	32	32	37	30	30	22	21	21
Fort Thomas, Ky. (Gen. Hos.).....						190	281	169	70	20	0	0	0	0	0	0
Montauk Pt. (Cp. Wikoff, Hos. 3th Crps.).....						19	38	36	35	34	39	23	20	18	18	18
San Francisco, Cal. (Div. Hos. Presidio).....						2	15	74	74	59	62	85	80	60	60	60
Huntsville, Ala. (various Hos. 4th Crps.).....						77	77	0	0	0	0	0	0	0	0	0
Chickamauga, Ga., (Sanger-Hoff Gen. H.).....						27	28	2	0	0	0	0	0	0	0	0
Fernandina, Fla. (various hos. 4th Crps.).....						100	167	200	300	50	23	23	0	0	0	0
Jacksonville, Fla. (various hos. 7th Crps.).....						10	10	0	0	0	0	0	0	0	0	0
Camp Alger, Falls Church, Va. (2d Crps.).....						1	0	0	0	0	0	0	0	0	0	0
Olivette (Transport).....						6	33	79	102	102	90	95	80	70	70	70
Porto Rico (various hospitals).....						6	0	0	0	0	0	0	0	0	0	0
Shinnecock (Transport).....						2	25	45	45	45	45	45	45	45	45	45
Fort Monroe (Josiah Simpson Gen. Hos.).....						31	45	90	90	34	0	0	0	0	0	0
Lexington, Ky. (1st Crps.).....						7	6	15	20	27	22	14	13	13	13	13
Camp Black, Hempstead, N. Y.....						3	3	40	39	24	14	4	0	0	0	0
Anniston, Ala. (2d Div. 4th Crps.).....						3	3	3	3	3	3	3	3	3	3	3
Knoxville, Tenn. (Div. 1st Crps.).....						1	1	2	2	1	0	0	0	0	0	0
Bedloe's Island, N. Y. (Post Hosp.).....						3	3	3	3	3	3	3	3	3	3	3
Plattsburg Bks., N. Y. (Post Hosp.).....						1	1	1	1	1	1	1	1	1	1	1
Fort Washington, Md. (Post Hosp.).....						3	3	3	3	3	3	3	3	3	3	3
San Antonio, Tex. (Fort Sam Houston).....						1	1	1	1	1	1	1	1	1	1	1
Savannah, Ga. (1st & 2d Div. 7th Crps.).....						125	125	130	130	130	130	130	130	130	130	130
Honolulu.....						19	19	19	19	19	19	19	19	19	19	19
Manila (8th Crps.).....						25	25	25	25	25	25	25	25	25	25	25
Americus, Ga. (2d Div. 1st Crps.).....						1	1	1	1	1	1	1	1	1	1	1
Governor's Island, N. Y.....						28	30	14	14	14	14	14	14	14	14	14
Columbus, Ga. (2d Div. 1st Crps.).....						7	7	7	7	7	7	7	7	7	7	7
Augusta, Ga. (Div. 2d Crps.).....						5	5	5	5	5	5	5	5	5	5	5
Fort Hamilton, N. Y.....						11	11	11	11	11	11	11	11	11	11	11
Greenville, S. C. (2d Div. 2d Crps.).....						14	14	14	14	14	14	14	14	14	14	14
Albany, Ga. (2d Div. 1st Crps.).....						7	7	7	7	7	7	7	7	7	7	7
Macon, Ga. (1st Div. 1st Crps.).....						3	3	3	3	3	3	3	3	3	3	3
Fort Snelling, Minn. (Post Hosp.).....						100	100	100	100	100	100	100	100	100	100	100
Havana, Cuba (Camp Columbia, 7th Crps.).....						73	73	73	73	73	73	73	73	73	73	73
Matanzas Province, Cuba (1st Crps.).....						6	6	6	6	6	6	6	6	6	6	6
Puerto Principe, Cuba.....																
	4	6	18	23	47	162	326	925	1158	1065	1104	880	695	750	682	686

any notes are inseparable from such an unfamiliar and hurried undertaking as the satisfactory selection, without possibility of previous trial, of any large number of persons claiming competency for special work. The same errors were made in assembling physicians, and even officers of authority.

But there were a multitude of others working steadfastly in the same interests as these women, that claim our consideration. We have already seen that the Regular army entered the war with a small hospital force, fashioned for peace, but inadequate and unprepared for the greater strain; while the large force of indifferently organized volunteers, which should have brought with it at least 6000 men for its regimental, ambulance and Di-

vision medical services, was utterly unprovided. The want and confusion were even greater than this statement would imply. Notwithstanding official recommendations as to the nature and strength of the regimental medical personnel, those important units came, under the law, without any working force except their medical officers, and three hospital stewards to each; plenty of broom handles, as it were, but no brooms. It is difficult to say what could have been done to meet this singular crisis, but for the fact that the hospital force of the Regular establishment was not then limited; and both by enlistment, and liberal transfers from commands, a corps was gradually obtained that could be used for all purposes. This was clumsy legerdemain, but the only possible resource under the irregular military conditions. I think that the phrase, "the fog of war" should be enlarged to cover such transactions. The number of men gathered in this way up to the close of 1898, was about 6000 and to this count must be added, but for a longer period, 529 male nurses, who were variously employed under the same contract as the women, and with the same pay. These men have done the same excellent work as the trained women, in the general hospitals, and upon the hospital ships to which they have been assigned, or in the more difficult and hazardous nursing of yellow fever.

But what can we reasonably expect from 6000 men, belonging in name to a hospital corps, but for the most part and on entrance in name only? You cannot sow a resolution for training, nor a good intention, and reap a crop of experts. With all the vigilance that can be exercised at a recruiting office, and the use of a careful conscience by commanding officers selecting men for transfer to the hospital corps, you can hope to secure no more than a body of willing, fairly intelligent, and workable men. In proportion as you are indifferent as to the willingness, and careless as to the intelligence, you will get a commensurate result. It is only under fair advantages as to time in which trial of fitness, morals, and endurance may be made that you can expect to eliminate the unsuitable, and get a residuum that is flexible, capable, and disciplined. That this may be done even with such material as we have described is within proof of sight and touch.

There is no secret in it but opportunity and hard work ; and the extension of these within a purpose acting steadily under a comprehensive scheme will secure for us a hospital corps fitted for our military needs and occasions, excepting only those of rare and passing emergency.

It is in no wise the purpose of this paper to discuss such a scheme and such an energy, but it is its intention to say plainly and vigorously that before the hospital corps of the army, Regular or volunteer, is blamed for this or that fault it should appear that the failure came after, and did not precede opportunity and education. It would not be wise to expect accurate firing from a battery filled a few days before an action with intelligent farmers and vigorous roustabouts.

When we secure a hospital corps numerous enough to do its work, with time and provision for training, and a reserve that is calculated upon a reasonable demand, not even the penalties of last summer will impair its value and self-reliance. I do not say that another catastrophe may not overtake and burden its best efforts, but there will be less meteoric criticism, and less necessity for accessory aid.

And here we reach the crux of the whole matter. If we obtain, by legislation, and good practice, a hospital corps which is ample in time of peace for garrison work, and as an example for war, to what military work, in either phase, may the female nurse be suitably assigned? This question is already approximately answered, but the definition should be accurately made. There should be no mistake in the covenant.

The regimental hospital has not, so far as I have heard, in its most domestic and monstrous form been supplied with, or advocated the assistance of women.

Is the Division hospital her advanced province? Certainly and emphatically not. It is unfortunate for military integrity that such a rank soil as that of last summer was offered for the growth of correct principles and sincere practice. It is an easy popular inference from the known history of the field hospitals at Chickamauga, Jacksonville, and at Siboney, that female nurses are essential to the success of all such organizations, to their care, cleanliness, dietary, and nursing. The colors are all at hand and are warmly applied. This confidence is not concerned

with detail, and has no reverence for full information. The Division hospital, which is the logical unit for medical field service, and will survive the new criticism, has created for itself a picturesque reputation that is destined to make trouble. It has frames, floors, wire mattresses, much bedding, and many conveniences. The hospital of experience is a lean, though active thing, by the side of this opulent hotel. It is for nimble service, and often stripped to the simplest necessities, waterproofs, blankets, and a chance concession for empty bed sacks. It must often ignore tables of supply; it cannot afford a superfluous ounce of flesh or anything else. Its transportation must go for its canvas, stores, clothing, utensils, and tools. Its intent is to cover barely, to receive the sick and wounded, but not to harbor them long; to be ready at an hour's notice to move. Furniture would be as impossible as melodeons or lawn mowers. Such a hospital must be manned. Its personnel are soldiers first, and nurses afterwards; for it is for hard service, and meant for fatigue, privation, weathers and confusion. It may be idle sometimes, and acquire Spartan luxuries, but nothing but some overwhelming misery of the sick should intrude an unaccustomed and alien attendance.

I am equally convinced that women should not be employed upon our rail or water transport, hospital trains or boats. While it is true that one of these steamers, the first in commission, has always had a small staff of female nurses, eight, and they are still with her since she was transferred to duty in the Pacific, it is equally true that another of like capacity has had an equal success with male nurses only, part employed under contract, and part by detail from the hospital corps. Men are more serviceable than women on shipboard, less liable to exhausting sea sickness, requiring fewer facilities and less comfort, and can be used for more purposes when, as frequently occurs in such sea duty, there is little or no work with the sick.

As to the hospitals called general, permanent, or base, there can be no question. Here we have a measure of tranquility, generally a construction that will receive or can be made to receive women, secure means, and for the most part an atmosphere that is kindly, and not harsh. The sign posts point towards home and to recovery, rather than to the camp and the

outpost. Here a trained woman is at her best, her order maintained, her methods undisturbed, the bugle is not a summons, and the discipline of a marching column is not at stake. In hospitals of this class the female nurse is a necessity.

So much for the camps, and the hospitals organized to receive their sick, fortunately within our history the least part of our national life and thought.

In the beginning of this paper I touched briefly upon the medical service of our permanent posts or garrisons, and its peculiar self-reliant condition. These posts, formerly much distributed and isolated along an artificial frontier, and for Indian restraint, have been from time to time abandoned or brought together for convenience, so that the tendency is towards fewer and larger garrisons, and for the latter larger hospitals. Still these hospitals are rarely intended for more than the sick of a regiment, and few hold more than twenty-four beds, with a possibility for moderate increase. They are compact buildings, whose arrangement, and subdivision for special ends, have been matters of special study, and evolved from much experience. The care and accommodation of men alone have been consulted.

The detachment of the hospital corps for such a hospital would be three non-commissioned officers and nine privates. The assignments would be to the office and records, the wards, operating room and laboratory, kitchen and mess, stores, drill, outside work and police; the senior hospital steward being in general charge under the surgeon of the post. There was, therefore, but one authority, or but one representative of authority, without possibility of conflict. The order was simple, but the work complex, for it involved all the duty of a civil hospital, with the instant readiness of a soldier for the medical service of the camp. The work was incessant, and the result excellent. Now women can be inserted into this régime, but at an expense, an inconvenience, and a risk that is not warranted. They must have a separate dormitory, a separate toilet, a different mess, and some facility for cooking and laundry work. They will often be unemployed, for there are a large number of cases in our military posts which they cannot properly attend. If the command takes the field the women must remain behind,

employed or not as the condition of the sick requires. It is not probable that the detachment of the hospital corps could be safely weakened in number, if readiness for the field is contemplated or insisted upon.

I can see much expense, idleness, risk of friction, and a certain disquiet about immorality, in this innovation, without commensurate gain. A long familiarity with posts and post hospitals makes me confident that unless these latter are substantially enlarged, accommodating for example the sick of a brigade, so that entire separation and privacy for women can be provided, the addition of female nurses to their working personnel will be a distinct disadvantage to their military conduct, and will introduce peculiar dangers.

Should we ever have general hospitals in our permanent service, receiving patients from large bodies or many sources, situated apart from troops, and without the need of that response to military conditions which must be exacted at a post, the female nurse may well displace the member of the hospital corps, although never entirely. There will always remain matters of military administration, of accountability, and record, which will require the hospital steward, and the hospital corps private. The medical officer in command will want such a purely military corner-stone for his more civil building, and a force more permanent and disciplined than that terminable under a contract. The troubles of this dual system are obvious to any one who has dealt only with a purely military subordinate under long familiar rule and routine, difficulties not of central authority, but among the agents. These should be brief, however, and do not strengthen an opposition to such an approach to the standards of nursing or attendance in civil hospitals as may be compatible with military method and precision.

The problem presented in the military employment of female nurses should not be obscured by enthusiasm, or what Dr. Bel-
lows, of the Sanitary Commission, called "the generous and restless desire to help"; nor by the distemper of depression that follows the revelation of faults in the customary system of relief. The means of improving that system are to be considered before we introduce another, and it is along this line of reason-

ing that attention has been called in this paper to the need of a broader basis of training for our hospital corps, in order that it may be qualified for its work. When this is done it will be apparent, in my judgment, that the field and occasion for the nursing and other hospital work for women may be wisely restricted to the more permanent and sedentary hospitals of war, and in peace to those larger hospitals that are not fused into the lives of posts, and permit of the discreet accommodation of women. I am speaking of a system, and system offers the surest guarantee against accident or need for improvisation, although it cannot, in the very essence of its intent to help, be obstructive or emphatic on such fields as those of Chickamauga and Jacksonville. Were Gettysburg to be fought again women must do most of the work of trained relief. There will always be these sanctified occasions.

I have several times during the course of this paper made passing allusion to the creditable work that has been accomplished by male nurses alone, and I delay for a moment here to be more explicit. It is no part of my purpose to draw a comparison between the results of male and female nursing; and the records given are not to be diverted to that end, but are to show simply that satisfactory work has been done by male nurses, under contract, or of the hospital corps, both in the situations which seem appropriate for men, and in a permanent hospital to which women might be assigned, within the construction of this paper. There is a marked credit also, in these instances, due to the high order of ability with which these establishments were administered.

A railroad hospital or ambulance train was organized and made its first trip from Tampa to Fort McPherson, between June 19th and 22d, 1898, continuing in this service until the spring of 1899, when such transportation was no longer required. This train consisted of ten tourist sleepers, a dining car, a private car, and a combination car. The medical force was two officers, two hospital stewards, and twenty privates of the hospital corps. There were also three civilians employed. The carrying capacity was 270, or 134 upper and 136 lower berths. Up to August 31, 1898, this train had run about 17,600 miles, and transported 1935 patients with only four deaths. This was

arduous though inconspicuous service, and the mission of this train was only casually remarked.

The hospital ship *Missouri*, with a capacity of 300 beds, was put in commission during August, 1898, and has operated since then between Cuban and Porto Rican ports and those of our Atlantic seaboard. Her average medical personnel has been six medical officers, seven non-commissioned officers and thirty privates of the hospital corps, and twelve male contract nurses.

She has to the present time carried 1454 patients, with 27 deaths. Of these 498 patients and 23 deaths are to be credited to typhoid fever. The surgical operations have included five for the radical cure of hernia, two for appendicitis, one amputation below the knee, and many of minor importance.

Among the points selected for the establishment of general hospitals having the post hospital as a nucleus was Washington Barracks. The post hospital contained 45 beds, and to these were added at first a camp, and later several frame pavilions, increasing the total capacity to 450 beds. The personnel of this hospital has been five medical officers, four stewards, seven acting stewards and thirty-five privates of the hospital corps. This includes the nucleus of a company of instruction. Since September 8, 1898, 2189 patients have been received from many sources, much surgical work has been done, 90 operations in all, including 29 for the radical cure of hernia, 3 laparotomies for appendicitis, and one nephrectomy. Of the eight deaths four were due to typhoid fever, and the others to causes almost necessarily fatal; none to operations.

Again I say that these records have not been selected because they are favorable to this or that argument, but because they do show that satisfactory results may be obtained without the introduction of women upon our land and water transports, and even on occasion in general or permanent hospitals of moderate size.

The foreign military practice regarding the employment of female nurses may be briefly described as a guarded admission of its value, the assignment of a small number of nursing sisters, chiefly of religious orders, to the large permanent hospitals in peace, and a provision for both these and the secular nurses of the National Red Cross societies for the base hospitals in time

of war. In all cases the whole matter of selection and numbers is left entirely to the Ministers of War, and the chief authorities of the several medical departments.

The British alone show a customary thoroughness in the treatment of this as of other medico-military matters. They have a small permanent corps of trained nursing sisters, at present 83 in number, including the Lady Superintendent living at Netley. Sixteen of these women are engaged in foreign service. There is also a nursing service reserve of 100 such nurses.

The assignments are made to the larger station hospitals, and for war "as circumstances may admit."

Pay is graded upon length of service, and the nurses are pensioned on retirement, with also an increase for length of service and devotion to duty.

It may be interesting in this respect to know that the maximum salary of the Lady Superintendent is £250, about \$1250 a year, including an allowance of \$250 for training the nursing staff at Netley. The pay of the nursing sisters is at first \$150 yearly, and for length of service it may amount to \$250 annually. A superintendent of nurses controlling a separate hospital may receive in all \$350 a year.

The employment of female nurses, restricted to members of religious orders, is a matter of recent experiment in Austria, undertaken within the last year, and so, in this experimental stage, limited to service in some of the principal hospitals. Should this venture be successful, as is anticipated, the introduction of religious sisters, though only for the attendance of serious cases in the "principal hospitals," will be carried to a greater extent. The use of female nurses in field sanitary establishments has not been contemplated, but the societies of the Red Cross, prompted by the Imperial War Department, have organized annual courses in which female nurses are instructed, with the intention of building up a corps, which in time of war can be used in the stationary reserve establishments of the base.

Germany has for her peace service the sisters of religious orders only, assigning from two to six in some of her larger military hospitals. They are permitted only when these contain more than one hundred beds. Their presence is not allowed in hospitals of the camps of practice; but apparently

they are admissible in the field hospitals of troops not actually engaged in a campaign. To these are added the nurses of the Red Cross during war. The pay is graded to 400 marks, about \$100 a year to each.

The French "*sœurs hospitalières*," or nursing sisters, are employed only in the large military hospitals which admit of absolute privacy for the women. No matter what their number their quarters consist of a common dormitory, a common refectory, an office for the superior, a general sitting room, a parlor, and an infirmary of several beds. From these the male attendants and patients are excluded. The number of these sisters attached to a hospital is determined by the Minister of War. Neither the pay of these women, nor any provision for their employment in war is given in the French Army Regulations.

The Belgian War Department covenants with the religious orders only, and employs chiefly the "*sœurs hospitalières*" of the order of St. Augustin, using these in all their military hospitals, including that of the camp of instruction at Reverloo. No agreement has yet been made to employ these nurses in the field hospitals of a campaign, but there is an understanding that they, with those of secular hospitals, may be attached to the sanitary establishment of an active army, under the existing agreement as to military hospitals ordinarily.

As to the Italian army practice I am uncertain, but it probably conforms to that of their marine, under which from 6 to 8 Sisters of Charity are employed in each of the Marine Hospitals. One or two are assigned to the medical and surgical wards, and they are placed in charge of the clothing and kitchen, the chapel, and domestic offices of the community. They have a separate lodging, and are paid 450 lira, or about \$90 a year.

Japan seems to rely upon her National Red Cross Society, in time of war at least, for much of her accessory medical service; but as this organization is under royal patronage it has a momentum and national significance not ordinarily possessed by societies of this name. In 1894, and during the period of the war with China, the membership of the Japanese Red Cross was 73,902, and it is stated that there were in the employ of the government 1170 medical officers, female nurses, orderlies,

and officers of administration furnished by the society. Of these 471 were female nurses serving in the base hospitals, situated in this case in Japan. This assistance is carefully subordinated to military and medical authority, and never allowed on the active front.

Switzerland has no purely military hospitals, and uses the civil hospitals for her occasional needs. In time of war deaconesses of religious orders, and members of the Red Cross, are employed as auxiliaries.

Mexico has as yet made no provision for the peace or war employment of female nurses.

It is probable that in all of these countries the supply of trained women controls to some extent the military view or intention as to their employment, and it is true that in few is the public so well informed as ours upon the value of their service. At the same time there is general intelligence on the subject and in some notable instances, as in France, much interest and inquiry have appeared. The English results are the fruit of long trial and much experience under a variety of military conditions, and probably represent the safest working model for us.

One trait is conspicuous throughout, the restriction of female nurses to places of security and reasonable privacy.

I do not suppose that to any of these authorities there has even occurred such a possibility as that, for instance, of the Sternberg General Hospital at Chickamauga, with an average occupancy of 450 patients, and a personnel of 27 medical officers, 159 members of the hospital corps, and 167 female nurses; or more impressive still, that brooding camp at Montauk Point, in which there were at least 10,000 sick, and a hospital of 1600 beds, employing 40 medical officers and physicians, 50 male nurses, 15 cooks, 133 men of the hospital corps, and 329 female nurses.

Of course the military future is inscrutable, and the memory for military and sanitary lessons is not retentive, but we may hope that should camps whiten our fields again, the preparation for war will precede its declaration, and that in this preparation will be included the fashioning of the hospital corps for its ultimate military purpose. This is not chiefly for the fragmentary work of a post, but for a larger unit of several activi-

ties, a division hospital, an ambulance company, interests in which the routine of a post is not concerned, and familiarity with which can only come from contact and training in some larger school. Our hospital men cannot, it is true, all be nurses, and we must remember in judging their work that the equivalent of the whole period of a soldier's enlistment is passed by women in their special schools of training; but better medical results in the field can be secured with due organization and steadiness than was done last summer without order and in a confusion of frenzy. It ought not to be possible to assemble again, even for the photographer, a hundred female nurses in a field hospital with troops.

The sober employment of accredited women for our military needs, within the bounds indicated, is admirable, and now that we have passed beyond the noise of the captains, and may rest and think, I am quite sure that this sober thing will be done.

NOTE.—When this paper was wholly planned, and practically written, the Surgeon General of the Army published, June 20, 1899, under authority of the War Department, a comprehensive and excellent scheme for the selection and employment of trained female nurses, and their distribution in our military service. This important subject may, therefore, be considered as closed, opening we hope only to such modifications as experience may demonstrate as wise and necessary. Nothing in this paper, therefore, is to be considered as debating this recently authorized plan, as indeed a priority of speech would make impossible.

"THE REORGANIZATION OF THE NATIONAL GUARD."

BY ERNEST MACPHERSON, LATE JUDGE ADVOCATE GENERAL
STATE GUARD, KENTUCKY.

"O, reform it altogether."—*Hamlet*.

THE very important problem of the proper method of reorganizing the militia of the United States should be considered with respect to practical and legal conditions. We have a Regular army of the United States and we have a militia of the several States, and occasionally the latter become volunteers, and, for the time, a part of the army. As a matter of course, no well-informed person is misled by the expression, the "National Guard." There is no National Guard of the United States or of any State except the Regular army. Time and again in the JOURNAL the inaccuracy of the phrase National Guard, as applied to the militia, has been explained and exposed.

It is assumed in certain circles that the militia who volunteered in our last war, even when composed of somewhat noted organizations, failed to fulfill their promises and the hopes of the country, and therefore the demand for a change in the manner of militia organization. In so far as the rank and file of the militia are concerned, we are not now in a position, our war having been brief, successful and recent, accurately to pass upon this question. We know that however organized, the armies of the United States, that is the Regulars and the volunteers, have always been successful. In considering the proper method of the reorganization of the militia, we must bear in mind the suggestion of Lamartine, that true reforms must begin at the top. Soldiers are proverbially conservative and even officers are sometimes under discipline, and prefer obedience to its rules rather than criticism of glaring evils.

Some philosopher has asserted the notion that the best reforms originate generally outside the particular class whose business is to be renovated. It is certainly true that the army

of the United States, ever glorious and ever victorious, has achieved its honors not always by or through the military administrations at different times having control and command of the officers and men who have won the results which so greatly redound to the glory of American arms.

To readers of the *JOURNAL* which speaks to military men, Regulars primarily and to some militia officers, it is well known that the organization of the United States army is radically defective. Before attempting to formulate a system which should make the militia organization perfect, it is essential that the laws in regard to the Regular army should be by Congress completely revised, and in the beginning deal with the headquarters of the army. Regular army as well as militia officers who have had experience in military matters, know quite well that the best method of making an army effective is to have a commander who has command. Our Regular army has nothing of that sort. Its commander, as a rule, is a civilian and he not the Constitutional Commander-in-chief.

The Regular army of the United States has been and will hereafter necessarily be the model and guide for the militia. If the former be essentially defective, those who follow its methods will inevitably make mistakes. It results that no change in the organization of the militia can possibly produce improvement until the supposed pattern of excellence that it must necessarily follow is conformed to the requirements of advanced military science. Our last war taught to military students little if anything that was not known to them before. The results were predicted and assured before a gun was fired. The success achieved has misled no one familiar with existing military conditions, and in no way contravenes the well recognized necessity of reorganizing our entire military service in conformity to the needs of the present day. Had our conflict been with some other European foe, say Germany, England, Russia or France, the present view of the American people in relation to the fore-ordained and uniform invincibility of our army would very possibly have been modified.

The army of the United States should be, as has been heretofore urged in the *JOURNAL*, so increased as to be able to act promptly and effectively anywhere on this continent. Why not

have this army now and hereafter organized in a military way? Many reasons have been given to account for the success of the Confederate army in prolonging the war between the States for four years. The true cause after all was that it was the best constituted army in existence at the time, and it started out with five generals. The reorganized army of the United States might well give place and duty to this number of officers of that grade. Why should we not have brigadier generals for brigades, major generals for divisions, lieutenant generals for corps, and generals for armies? Because a few men only have held the rank of general in our army, why should we be so absurd as to ignore the universally conceded military proprieties in rank and grade all over the world? While making necessary changes, the office of Secretary of War should always be filled by a soldier taken from among the generals of the army. The Secretary of Law, the Attorney General, is appropriately chosen from the ranks of the active attorneys. The same principle would dictate that the Secretary of War should be selected from our warriors.

Not the least cause of mishaps in our last war was the difficulty in applying the official regulations; the failures were in administrative matters. The official regulations of the United States army as now published and as now modified by all the orders issued from the War Department, are absolutely incomprehensible in an administrative way to any soldier not trained for years under our present system and stationed at headquarters. If to-day by any means Napoleon, or Frederick, or Wellington were put in command of the American army, he would be absolutely at a loss to know, not how to fight, nor how to win victories on the battle-field, nor how to prepare the army he might bring with him for such service, but how properly to recognize military authority, and how to render reports and to make requisitions which would satisfy the cumbrous and absurd system of independent commands of Quartermaster Generals, Commissary Generals, Judge Advocate Generals, Surgeon Generals, Paymaster Generals, and other general officers in the multiplied separations of our service, all being commanding brigadier generals and being under nobody by law except the President and the Secretary of War.

Truly their control is only of a limited character. A Senator of the United States and former Secretary of War, in discussing the retirement of a recent Secretary, is reported as saying that when the latter "took charge of the War Department he found himself hedged about with many difficulties, over which he had no control at all, and which were an outgrowth of the American system. With European governments it is customary to make changes in the staff and to make such reassignments as the circumstances demand, but our system is positively inflexible. A man upon the staff is there during his military life, and the Secretary of War is not free to reorganize the business of his office to the best advantage."

Thomas Carlyle in his "French Revolution" tells how the people cried aloud for a Constitution that would "march." The American soldier cries to-day for a military system that will "march."

The reconstruction of the American military system will be had with scrupulous regard for the traditions and principles of the people which allow only a small standing army; the popular theory is reliance chiefly upon a "well-regulated militia" which the fathers thought and taught was "essential to the security of a free state." A standing army of from seventy-five to one hundred thousand men would be small in proportion to present population.

The militia is now being reorganized throughout the country on the old and familiar lines, which in some degree must always govern these particular forces. The authority of training the militia according to the discipline prescribed by Congress and the appointment of the officers are, whether in time of war or peace, always within the exclusive competence of the several States. But the Congress have power to provide for organizing, arming and disciplining the militia, and in these respects the powers of Congress are great. The organizing and arming should conform as nearly as practicable to that of the Regular army. In some details of administration there will unavoidably be variances in the different States, but the general outline and plan should be the same all over the Union.

The provisions of the law to be passed by Congress should require of the States certain methods of instruction and the

general government must furnish the money requisite for the purpose. Militia may be efficiently taught, or "disciplined" into, a few things only. But when so disciplined, they will become readily in any army good and reliable soldiers. These things are (1) drill, (2) rifle practice, (3) camping, including the march and sanitation, (4) guard duty, (5) official regulations as so designated in our service. The main need is money, and as many of the States do not or can not provide this, it must come from appropriations by the general government. The present system of awarding arms, munitions of war, clothing, etc., according to the theory of not less than one hundred organized militia to each congressional representative is not the most wise. A certain sum must at all events and for many reasons be given to each State, but the militia fund appropriated by Congress should generally be apportioned among the States, not according to the number of men of a particular command, nor according to the number of representatives a State may have in Congress, but according to the proficiency of the militia troops as shown by inspections made by officers of the Regular army. In the militia no less than in the army, in the routine and canker of long peace, officers and men become negligent, and therefore prizes should be awarded for competition, at least among the troops of a particular State, for proficiency in the things required to be known by the militia. If these prizes could be made interstate, as well as among the militia of a particular State, there would be greater incentives to exertion and more powerful spurs to military ambition. The general superintendence and inspection by the general government of the militia should be made by officers of the Regular army, not detailed through favoritism or any political "pull," but by men selected for known ardor in the work and skill in the particular duties assigned.

If necessary, let us have official regulations applicable only to the Regular army, and a separate set of regulations applicable to the militia or volunteers when called into the active service of the United States, the latter to be amplified in detail so as to show in a clear and unmistakable way to an educated soldier not familiar with the regular system, what is required to be done in an administrative way when the militia is called upon to

volunteer into the service of the Federal government. Militia officers, as a rule, do not study the official regulations of the United States army for two good reasons; first, they are only at intervals accessible in any complete book form, because constantly modified and changed by orders from the War Department; second, because many of the States have regulations of their own which are sufficient for the needs of the local service. A third reason might be advanced from practical experience had in our last war by some officers who studied what were called the official regulations, and found by practice that in many of the most important details the officers were to be governed by orders which they had never seen nor heard of, and which had never been issued to them, and which varied from the official regulations as published in the most important respects.

The drill regulations must be the same for the army, the volunteers and the militia, and these will bear prompt revision, the alterations to include many of the matters which were embraced in Upton's *Tactics*. To mention a few things among hundreds that might be noted, trifling or important according to the point of view, there should be restored to the artillery drill those paragraphs relating to the packing of ammunition for muzzle-loading guns which the militia will often use, and the correct manner of handling explosives; in the infantry drill, have guard mount extended so as to include everything in the so-called manual of guard duty, which manual has undergone changes for years only in a few essentials; the amendments have related mainly to the manner of rendering honors—whether a sentinel should present arms to officers above the rank of captain, or give a sergeant's salute to a lieutenant, or give a rifle salute to all officers, or stand at attention, is a matter of very small moment, except in the way of uniformity, but in these trifling details we change as each manual is issued. We have plates in the drill book showing the form of an advance guard, but no drill for putting the men into this condition. In the battle tactics even, paragraph 553, "Instructors will teach the men how to prepare the crest of a wall and how to pierce loopholes or construct platforms when the wall is too high to fight over." An educated soldier knows how to do this and could explain it in words not occupying a page in the drill

book. Why omit all these things? "Instructors," even among the Regular officers, are not invariably competent to give this instruction.

To the oft-repeated objection to the election of line officers by members of the militia, many answers may be given. The majority of the States, as shown by their laws, prefer the elective system. In the few States wherein the appointive system prevails, the officers so selected are at best no whit superior to those of States pursuing the elective method. In our recent trouble with Spain all the officers of a regiment were appointed by the chief executives of the States, preference, as a rule, being shown to elected commanders holding offices in existing regiments. Did the selections of the Governors when untrammelled go to appointees who were supposed to be persons of military experience? In one State the only regimental commander appointed by the Governor and not previously elected to the position, was the only colonel who was entirely without any military experience.

To go higher, were the presidential appointees, all or the majority from among civilians men of military training or experience? The rank and file of the militia, as a rule, select the men they think will make the best officers. They know something about the men they select to command them; the Governor almost invariably knows nothing about these men.

The reorganization of the militia would, as a matter of course, be facilitated if some one would devise a plan by which the Adjutants-General of the different States could be appointed with a view to military fitness, and not with sole reference to political considerations. The militia of no State can flourish when the Adjutant-General, who is practically the commander, is appointed because a personal or political friend of the Governor. At times the office of Adjutant-General is the most important in the gubernatorial cabinet, and its duties to be efficiently discharged require the services of a military man. In one State it was believed, if not openly avowed, that this important office was given to a man whose sole qualification was bravery exhibited in leading the charge at the (say) Bungtown precinct when the ballot box was lost.

GOVERNOR ROOSEVELT'S STATE CAMP INNOVATION.

By L. J. F. ROONEY.

WHEN Governor Roosevelt, last winter, acting in his capacity of Commander-in-chief of the State forces, announced that he intended during the summer encampment of the National Guard at Peekskill, to give the troops a taste of real field-work, many old Guardsmen thought there could be little gain by "marching along a road for a couple of days and then marching back again"!

Others there were, however, with the true military instinct, who hailed the innovation with delight and predicted that the carrying out of the new idea would prove of the greatest benefit to the National Guard. These latter argued, and rightly too, that the purposed conditions would certainly be nearer actual conditions as they exist in warfare, than the old system for many years in vogue at the State Camp of Instruction at Peekskill. As a close approach to actual conditions to be met has always been granted to be the best training, it must be admitted that the *pros* in the debate held strong ground.

It may here be noted, for the information of the lay reader, that previous to this summer's encampment at Peekskill, a regiment or smaller organization performed its week's service in and around the perfectly laid-out and graded camp, the tents having board floors, cots with mattresses, a large mess-house where the meals were provided under State contract, a restaurant near at hand, reading and writing rooms, a bath-house and a well-regulated sanitary system.

No doubt the above-mentioned facilities did not appeal strongly to the Governor with his practical ideas and a fund of experience to draw from. He probably thought the camp a good basis of supply or headquarters but a poor place to train troops to march, to bivouac, to pitch tents, to strike tents, to cook their own food, to load and unload their wagon-train

quickly and well, to teach the first principles of military hygiene and sanitation, to feel for a supposed enemy while on the march, and, having found him, to attack or check him,—in short, to train in the direction of greater self-reliance and greater utility.

Having reached a conclusion on those important points, our war-Governor decided to start the ball a-rolling himself and set the example at the top where it should be; and forthwith he ordered out his horse and drew on his gauntlets and buckled on his spurs and took the road with Squadron A from Manhattan to Peekskill.

Thereupon the people, and particularly the National Guardsmen of the State, rose up and exclaimed, "Surely we have a real, live Commander-in-chief of our State army!"

The writer, believing that the Seventh Regiment with its full ranks, complete equipment and thorough discipline, would furnish a practical test of the new system, selected it for observation and accompanied it, through the courtesy of Colonel Appleton, during its four and one-half days' service on the march and in the four camps that were pitched and occupied during that period.

Sunday, June eighteenth, saw the Post Quartermaster and Commissary Departments busy preparing for the march-out on the following day, and necessarily the like departments of the regiment were not idle.

Preparations were being made to equip only the first battalion of five companies, as it had been decided that but half of the regiment at a time should be on the march—the remaining half occupying the camp proper and performing the usual drills, etc.

This plan was a conservative one, as it conduced to greater stress being laid on matters of detail and greater facility for observing errors and correcting them promptly.

On Monday morning at 8.30 the first battalion, commanded by Major Abrams, nearly five hundred strong, marched out of camp amid the shouts, cheers and well-wishes of the remaining members of the regiment and many visitors. As the column passed into the woods along the McCoy road, it gave every evidence of sturdiness and capability—each man carrying over

forty pounds and wearing the familiar leather cuff-leggin, campaign hat and gray shirt with red kerchief tied loosely around the neck.

Colonel Appleton accompanied the command to observe the movement and take notes for use during the march of the second battalion, which he intended to accompany also. The enemy was supposed to be in the vicinity, so the column was formed with an advance-guard and a rear-guard, each consisting of one company.

The marching of a force under such conditions—in the vicinity of the enemy—is termed a *tactical march*, in contradistinction to a *strategical march*, in which the enemy is at a comparatively great distance.

A couple of miles from the home-camp the wagon-train or "transportation" was met, it having proceeded by the river road in order to avoid the hills. The transportation consisted of ten wagons, each drawn by two horses. The latter were all that could be desired, but the former immediately impressed one with the belief that they were hardly fitted to reach any very remote point. The fact that the entire outfit was picked up in Peekskill by the Quartermaster's Department explained such unmilitary legends as "Pianos Moved," "Dunderberg's Express by J. Quimby," and others of like tenor.

When this very necessary part of the expedition had been assigned to its proper place in rear of the "main body," the completed column moved forward once more. The road was good and took its course up the valley. Beautiful hills rose to the right and left, and a creek ran along near by. The woods, the thick bush growth, the precipitous hillsides, the creek and numerous stone fences, and more than all else the many turnings of the road, prevented a casual spectator seeing all or even a part of the work being done by the battalion. Although the command seemed moving along carelessly "at ease," with no particular object in view but to arrive at some given point ahead, there was to the military eye a perfect machine carrying on its given work under masterly guidance.

The formation of the command in a general way resembled a person's hand, wrist and forearm—the fingers being outspread. The finger-tips represent "the point" and "flankers" whose

duty it is to feel the way and find the enemy, who may be lurking near by. The wrist takes the place of the "reserve," and the forearm represents the "main body," "transportation" and "rear guard." It is the duty of the "rear guard" to protect the "transportation" and rear of the column from attacks by the enemy's partisans and to arrest stragglers and marauders.

The entire command must at all times be in perfect touch; and to carry out this, "links" or "connecting files"—one, two or three men—as the nature of the country requires, are detailed to the proper points to keep up this communication or connection. The major in command of the battalion orders the halts according to his judgment, and receives the reports from his officers. Colonel Appleton has dismounted by this time and is walking up and down the column, keeping his eyes open and asking questions. The battalion pushes ahead noiselessly, for its approach must be unheralded. A drum is inadvertently struck and the offender is immediately "in trouble." Water is by the roadside, but no wild scramble for it occurs, although the men eye its inviting coolness.

At last, after a five mile and a half journey, the first camp-site comes into view, the "advance guard" marches beyond it to protect the northern flank, the "main body" turns into the stone-fenced enclosure, the "transportation" follows, and each wagon halts at the stake which marks the head of its company "street." These stakes had been set by the Engineer Corps under command of Lieutenant Towle, who during the march was with the "advance guard" carrying on his topographical work and collecting information, but who had hurried forward during the last half-mile to lay down the camp lines.

Now all was bustle on every hand. The tents and poles, cooking outfit and quartermaster and commissary property came out of the wagons with the speed only developed by clever organization. Everything had its place in each wagon. Every man knew what to do and did it with a will. In five minutes the smoke was curling from several company fires, and in twenty minutes one could get as good a tin cup of coffee as one could desire.

But while one's attention was taken in watching the "kitchen details" at work, other things were transpiring: the

tents were being pitched, the guard posted around the camp, the horses unharnessed and tied up, a foot-bridge thrown across the little creek, a staging built into the creek for bathing, the spring guarded, and a hundred other details being attended to which conduce to the locating of a well-ordered camp.

When at 12.30 the dinner-call was sounded it was remembered that the battalion had marched into this camp at 11.05, that the canvas was all in place at 11.40; and now a good dinner of stew with lima beans, bread and butter, prunes and coffee was being served exactly on time. And it may be said in passing that the dinner was of good quality and well prepared. That it was cooked so promptly and well brought to mind the fact that the regiment had been at work during the winter in its armory kitchen and recently in the field at Babylon, Long Island, in anticipation of the present situation.

In looking down on the camp from a neighboring hillside, its vicinity gave many evidences of affording a strong defense, for many stone fences crossed the valley and ran along its length. There was a plentiful supply of wood too, but as the State did not rent the property with wood privileges, the soldiers had been furnished cord wood and were duly grateful in consequence—for the wood question ranks next to water in field operations.

During the afternoon two companies, at different times, marched out of camp and performed "outpost" duty, it having been determined to give each of the five companies some practice in this important feature of field work.

Major-General Roe and Brigadier-General George Moore Smith rode into the camp in the afternoon, and after a close inspection expressed satisfaction at the results thus far achieved.

Supper is prepared and again attracts attention on account of its inviting appearance and quality. Surely these amateur cooks know their business and are bound to make a record by strictly attending to it.

And soon the twilight is upon the camp and here and there is seen a soldier with an armful of straw, wending his way to his tent. They have been foraging for their beds, and the farm houses have been approached and have yielded to the blandishments of the dime and nickel.

It has been a day of hard work and an early start must be made in the morning, but the evening is such a beautiful one that "taps" seems to come too soon.

Daylight next morning sees the camp astir. Breakfast is soon out of the way and the tents are being "struck." The wagons are packed, the camp "policed," the disposition of the column is made by the major, he orders his bugler to sound the "forward, march!" and away they go at 7 o'clock for a six mile tramp—and they're going up-grade all the time, too.

Those poor "flankers" out in the woods and thickets are going to have a hard time. They must fight their way through all sorts of places, and carry their thirty pound pack and ten pound rifle besides! Oh, yes! that's killing work where the ground is uneven and covered with little bushes and weeds and stones and soft places to put your foot into, and hard places to fall upon! Then there are fences to climb and branches to "swing" on you and "upper cut" you; but they "don't count," for your comrade to the right is shouting to you, and he to the left is "saying a few things" at you, and the officer in the road to whom you report isn't "doing a thing" to the three of you! But it's all very necessary in a tactical march, such as is being made. Only about two miles had been travelled when suddenly one of these "flankers" ran into the enemy's vanguard and opened fire for a warning. Along comes the "support" at a "double," the word goes back to the "reserve," and it moves up to strengthen the "support" when necessary, the "main body" is notified and gets ready for action. The crack of the rifle is continuous along the stone fence which runs at right angles to the line of march and now covers the firing line of the advance guard.

Colonel Appleton and Major Abrams being satisfied with the prompt and intelligent grasp of the situation by officers and men, the enemy is supposed to have been checked and "cease firing" is sounded by the bugle, the original formation is taken and the battalion again is plowing along in the dust.

Here and there along the road the country people are grouped, the farm houses display flags, and welcome and kindly greetings are the rule—with no exceptions. It is a scene well worth many miles of travel.

The last ascending grade in the road is being climbed and soon the sparkling ripples of Oskawana Lake are seen through the green trees and the command is led to a little knoll on the edge of the beautiful waters that have in bygone years been so dear to old New Yorkers; for it was one of the quiet summer country resorts in days past, and even now has quite a little colony of the city weary.

This camp has been selected, evidently, to give variety to the work of pitching tents: it's on a side hill, on the crest, at the foot, on the open, under trees, on rocky ground—a spot to make even an old soldier think twice before he goes to work. It is the best sort of practice ground, however, and that's what it all means. Good instruction and organization tell here too, and the canvas is in place in a hurry.

Dinner is preparing. Many of the men are in the lake—some of them boldly striking out for the opposite shore three-eighths of a mile distant, the “transportation” is roping-off a corral for the “stock,” the colonel and Major Abrams are moving about saying little—for there is no occasion for it—the talking has been done long ago—the one word “discipline” tells the rest of the story.

In the afternoon there are skirmish drills: two companies holding a hill and three attacking it. Captain Townsend commands the hill, and, occupying the *military crest*, with an engineer's eye, is voted to be still in possession when the firing ceases.

Hardly have the companies returned to camp from their skirmish drill when the storm that has been skirmishing also, brings up all its “supports” and “reserves” and blackly and sullenly crouches all along the line. The heavenly artillery covers the advance for a minute, the roar of the coming wind is the “rapid fire” of the “firing line,” the sudden scream of the “charge” rises wild and fierce, the watery battalions of the curling clouds sweep down and the first battalion, Seventh Regiment, “gets busy.” Two wall-tents on the windward flank of the camp go down, the men brace their swaying and flapping shelters and take their ducking; the officers are at work too, while the colonel in rubber coat stalks through the camp to see that every precaution is being taken to insure the welfare of the

command and the safety of State property. And all that is excellent practice.

Before seven o'clock next morning the battalion is moving along the road on its return to the home-camp at Peekskill—nearly twelve miles off. It is a long, hard pull—that twelve miles with forty pounds on the back, with the mercury looking for a breathing-hole in the top of the tube! But they keep at it steadily at the speed of a forced march for three hours and a half, and then march into camp and report to Headquarters.

At three o'clock in the afternoon away goes the second battalion, Major Conover in command. Colonel Appleton is again in the saddle and on foot as the opportunities for observation could best be served. The same care and thoroughness in every detail of organization are here noticed, and the return to camp on Friday morning at about eleven o'clock is accomplished without a mishap or jar.

Both battalions stood up well under the hard and unaccustomed work—vigorous athletes that hundreds of them are.

Colonel Appleton and the regiment at large spoke in the highest terms of the new system; in fact, the colonel expressed the hope that next time he would be permitted to take the entire regiment on the march, "for," said he, "we can handle the regiment just as easily and well as we can a battalion." Anyone who followed both columns and lived with them for the week, will not be inclined to doubt that statement.

Major-General Roe and Brigadier-General George Moore Smith were greatly pleased with the regiment's work and the practical results which the Governor's innovation has thus far achieved.

Now that the Guard seems to be started on a new and more wholesome career, it may not be too much to expect in due time a Krag-Jorgensen rifle, a Khaki or canvas uniform for field-work, a regulation wagon-train, an improved cooking-outfit, light-weight incinerators, the passing-away of the unmilitary caterer system at the Camp of Instruction, and the substitution of the soldierly method of each organization cooking its own food, even at the expense of hiring a professional cook for each company as in the Regular army. Neither might the simplification of the "paper work" and as close an approach as possi-

ble in this direction to the forms of the Regular army prove amiss.

If one can judge by recent events, Governor Roosevelt, as Commander-in-chief of the National Guard of New York, has adopted "utility" as his watchword, and his soldiers look with confidence to whatever duty the future may bring.

FIELD ORGANIZATION OF THE SUPPLY SERVICE IN THE RUSSIAN ARMY.

BY E. DEVERRE, SOUS-INTENDANT MILITAIRE DE 3^e CLASSE.

TRANSLATED BY LIEUT. COL. HENRY G. SHARPE, A. C. G. S., U. S. ARMY.

MEANS OF TRANSPORTATION.

BY reason of the great dispersion of the inhabited places in the immense territories of the Russian Empire, it will be foreseen that in that country the troops would rarely be billeted on the inhabitants, but would be placed in bivouac nearly all the time. Hence the necessity of having them followed by well equipped trains, somewhat large undoubtedly (2400 wagons for an army corps of 45,900 men), but difficult to reduce if it is desired to provide each unit with what is necessary.

To each body of troops, service or staff has then been allotted a regimental train (*polkovyé obozy*), which carries in the wagons, called the first echelon, the ammunition, medical supplies, and likewise the indispensable part of the officers' baggage (except in the cavalry and horse artillery where such baggage is carried on the led horses). This baggage is packed in waterproof canvas and comprises the utensils for making tea and for cooking, a certain quantity of provisions and a piece of felt in the form of a mattress; the whole weight does not exceed 7 kilogrammes (about 15 ½ lbs.).

The wagons of the second echelon, on the other hand, can,

if the tactical requirements exact it, be relegated to the rear of the main body of the troops. They serve to transport the supplies, the cooking utensils (weighing about 100 kilogrammes (220 lbs.) for each company), the religious emblems, the necessary material for repairing the arms, shoes, harness, wagons for shoeing the horses, finally the technical material.

This second echelon can include the movable kitchens (wagons with four or two wheels). It is followed by the cattle herd, the slaughter of which must be provided for by the corps. Each company provides itself with the necessary tools for this work.

The regimental trains carry thus, as we see, all the stores and all the tools in daily use and required at each halting station; they are the means for making the distributions.

Moreover, each division of infantry or of cavalry is allotted a divisional train (*divizionnye obozy*), means for resupplying and restoring deficiencies, to which is assigned the duty of replacing in the regimental trains the articles lost or consumed and of transporting the stores and articles of secondary importance which the troops do not require daily.

These divisional trains assure a constant connection between the regimental trains and the centres of supply established in rear of the troops, and permit of grouping together all those trains of the division which, nominally or temporarily, are not connected with the regimental trains of the various units.

A divisional train is divided into: 1. A general section carrying the reserve supply of tools, clothing, etc., and accompanied by spare horses (rather small in numbers compared with our movable remount depot);

2. A subsistence section comprising a column for distribution for the daily resupply of the regimental trains, and intended, moreover, to form in the future (for the infantry divisions) a reserve column destined for the resupply of the column for distribution by going to reload at the centres of supply (and filling thus a rôle somewhat similar to that of our auxiliary trains);

3. A hospital section which is subdivided into a divisional ambulance and two field hospitals.

Only the infantry divisions are allotted this last section; in

those divisions the general section and the column for distribution are subdivided into six parts, assigned: four to the four regiments of infantry, one to the artillery brigade, and one to the headquarters of the division and to the commanding officer of the divisional train.

This arrangement makes it possible to have every infantry regiment detached from the division, followed by its proportional parts of the general section and subsistence section.

To each army are assigned certain trains, either military or auxiliary (hired or requisitioned) and designated also as wagon trains and pack trains of animals. The personnel of these trains (at least as *cadres*) is supplied by the mobilization of the train battalions, while the trains of which we have spoken above are horsed and driven through the functions of their units.

All the trains in an army are placed under the control of the director of the army trains. They provide all the transportation for the material and the provisions from the centres of production or of manufacture to the magazines and even as far as the troops, as well as all the evacuations of wounded, sick, and of useless material.

The composition of these trains is provided for, either by 183 two-horse wagons, or 131 three-horse wagons, or 116 four-horse wagons, or 352 pack animals. Consequently at the rate of 415,575 or 675 kilogr. to each wagon, and of 100 kilogr. to a pack animal, the capacity of a wagon train would be from 70 to 73 tons, and that of a pack train about 29 tons (account being taken of the wagons or animals used by the *cadre* of the train to transport the baggage and material of the two parts into which the train is subdivided).

COMPOSITION AND WEIGHT OF THE RATIONS.

The necessary provisions for the Russian troops in time of war include the following: *

1. The rations proper, hard tack (biscuit) weighing 720

* The weights and numbers of rations indicated in this article are those included in a new plan for regulations on the subject of supply in time of war, dating from 1898, which materially changes the former allowances. It is, moreover, foreseen that under exceptional circumstances the weights of the rations can be diminished by the orders of commanding officers of the army or of army corps.

grams, for the daily allowance (this hard tack being replaced whenever possible by 1025 grams of rye bread) and grits weighing 100 grams.

2. The rations for cooking, issued either in kind or under the form of a corresponding allowance, and comprising:

410 grams of fresh meat or 305 grams of canned meat;

760 grams of potatoes or 300 grams of sourkrout, or 260 grams of peas;

21 grams of wheat flour;

146 grams of oatmeal;

43 grams of lard or butter;

47 grams of salt;

finally, various spices (onions, pepper, oil, etc.).

3. The tea and sugar, daily allowance of 6.4 grams and 12.8 grams.

4. Brandy and wine allowed in certain cases, either under the form of an allowance, or (for the alcohol) in kind and at the rate of from .08 lit. to .15 lit. (alcohol of 40 per cent.).

5. Lastly, vinegar or citric acid to mix with water in summer, granted by way of a corresponding allowance of .08 lit. of the first or of .04 lit. of the second.

The forage ration only includes hay and oats; it is either the ordinary ration of 6.15 kg. of hay and of 5.64 kg. of oats, or the reduced ration of 4.10 kg. of hay and 4.92 kg. of oats.

Naturally in case of necessity substitutions are made for the forage, as can likewise be done for the rations.

NUMBER OF DAYS' RATIONS FOR WHICH THE RUSSIAN ARMY PROVIDES.

The Russian troops not being accustomed to make soup in their individual pots must wait for it until the arrival of the second echelon of the regimental train. It often happens that the soldier consumes, while thus waiting, a part of the supplies he carries; the regulation anticipates, however, that he can arrange for that with a day's allowance of hard tack, salt, tea and sugar. The two other rations of these stores, as the ration of canned meat, should on the contrary, be consumed only by order of the commanding officer and form reserve rations.

The following are all the supplies of the first line available for the troops :

In the Infantry, Field Artillery and Engineers.	Rations Carried on Person.	Rations in Regimental Trains.	Rations in Divisional Trains.	Total.
Hard Tack	3	2	4	9
Grits	—	2	4	6
Salt	3	2	4	9
Tea	3	2	4	9
Sugar	3	2	4	9
Canned Meat	1	—	2	3
In the Cavalry and Horse Artillery.				
Hard Tack	3	2	2	7
Grits	—	2	2	4
Salt	3	2	2	7
Tea	3	2	2	7
Sugar	3	2	2	7
Canned Meat	1	—	1	2

On account of these movable reserve rations, the Russian troops can, as ours, either turn to account the local resources and utilize immediately the supplies collected in the localities occupied, or draw what is required from the regimental trains, free to resupply as far as possible these latter with the local products.

The Russian regulations anticipate these two methods, and, like ours, they foresee also the possibility of billeting upon the inhabitants, purchases for cash, requisitions (which are termed military if they are made by the troops and regular if they are made by the intendance), and finally the consignments from the rear of supplies previously collected in the national territory in order to aid the supply of the troops concurrently with such supplies as may be collected, even in the theatre of operations.

ISSUES AND RESUPPLIES.

The wagons of the second echelon of the regimental train provide either the resupply of the rations carried by the men, or the regular daily issue.

Afterwards, to resupply these trains, the local resources will be turned to account, or, if necessary, recourse will be had to the division trains.

In a similar manner to that which is adopted in the French administrative trains, one of the parts of the column for distribution passes beyond the halting place of the column and advances at least as far as a half day's march from the cantonments of the troops. Starting out the following morning at a very early hour, it goes to resupply on the spot the empty wagons of the second echelon of the regimental trains. These latter not starting on the march until some hours after the troops, have all the time necessary to resupply themselves and resume at the proper time their position in the column.

The empty part of the column for distribution awaits at that place the arrival either of the reserve column of the divisional train, or a military or auxiliary train. After being resupplied it rejoins the main body of the divisional trains.

The provisions collected in the magazines of the service in the rear are transported either by the reserve columns, if the distance can be covered in 24 hours, or by auxiliary trains if the troops have advanced more than two days' march. These provisions are in fact delivered to the trains or to the convoys, either at the magazines themselves, or at ports or stations which the magazines can reach.

Near the magazines established for a period sufficiently long principal bakeries are fitted up. For the purpose of organizing them, the local resources in flour and ovens are taken into account, and besides, in time of peace there have been collected in the depots of the base of supplies the material necessary for the establishment of the movable field ovens.

THE SWISS TROOPS.

BY MAJOR NEWBOLD MORRIS, INSPECTOR FIRST BRIGADE, N. G.
N. Y., LATE CAPTAIN 12TH NEW YORK VOLUNTEERS.

SWITZERLAND, a country interesting to both tourists and students of political science, is not less so to those interested in military organization under conditions somewhat analogous to our own. We owe our security to our isolation, but the Swiss owe theirs to their state of neutrality guaranteed at the Congress of Vienna in 1815; as history has shown, such neutrality has not always been respected when inconvenient to a great power, therefore while Switzerland does not require to be perpetually on the war footing, like her great neighbors of the Dual and Triple Alliances, nevertheless she makes provision in a democratic and economical, but effective way, to protect her independence if need should come.

Under the present system, established by the law of 1874, the Swiss military forces consist of the *Élite*, the *Landwehr* and the *Landsturm*; the Commander-in-chief is chosen by the Federal assembly, but he never has more than the actual rank of colonel, which is the highest in the service; officers of like rank command the four army corps, the eight divisions and the brigades into which the forces are divided and are styled according to their commands "*Colonels commandants de Corps d'Armée*," "*Colonels-Divisionnaires*" or "*Colonels Brigadiers*," the Chiefs of Departments also hold the rank of colonel.

The *Élite* numbers 141,354 men of all grades and arms, the *Landwehr* 80,297 and the entire *Landsturm* armed and unarmed 264,723, in all 486,374; the first consists of all able-bodied Swiss except the usual exempt classes from their 20th to their 32d year, and they are annually in service 45 days; the *Landwehr* includes all from their 33d to their 44th year and undergoes 5 days' training in every fourth year; and the *Landsturm* comprises all others from their 17th to their 50th year and is

mustered, whether armed or not, one day a year, for inspection and instruction.

The training of the Swiss begins at school, where he is taught to march and is properly set up by simple gymnastic and calisthenic exercises; later when he enters the service he is expected to devote some attention to rifle practice, which he may do in his own village, each community having its own range which it must provide free of charge, under article 25 of the Military Law, and wherever there is a rifle club of ten or more members it is subsidized by the State and the practice is supervised by a federal officer. Every soldier is expected to qualify as a marksman, and on making the requisite score up to 400 metres, he receives 36 cents as a compensation; in case he neglects this duty, he is ordered to a musketry school for three days. The *Élite* and most of the *Landwehr* have a twelve-shot repeating rifle which may be used as a single loader; the remaining troops have a rifle of older model.

Every soldier keeps his rifle, uniform and kit at home, as well as cartridges for emergency in a sealed tin case. At intervals everything is inspected and any neglect of arms or clothing is punishable by fine and imprisonment. The uniform is simple, consisting of a five-buttoned double-breasted coat of dark-blue cloth, which is changed for green in the cavalry and rifle regiments and for light blue in the case of medical and veterinary officers; it falls as far as the closed fist and fits closely at the waist; a high *képi* is worn with pompon in front and visors front and rear; the trousers are of mixed marengo and a belt with a plain buckle without plate encircles the waist, supporting in the infantry a sword-bayonet and two cartridge-boxes. The officers wear a similar jacket with shoulder straps indicating their rank by one, two or three stars for the company officers and the same stars enlarged for the three grades of field officers; the Swiss are the only European officers who wear this ornament; their cap is of the French pattern.

There is a corps of instructors for each arm of the service, as well as for each staff department, which is charged with the instruction of its own arm; in each branch the instructors are under an "*Instructeur en chef*," who is in turn subordinate to the "*chef d'arme*" (head of the particular branch of the service at

the Military Department). The instructors of infantry are assigned to territorial divisions, those of the other arms to their respective arms. The corps of instructors is permanent and a federal establishment. Non-commissioned officers and candidates for non-commissioned grades attend schools of instruction, in addition to their other service, of from four weeks in the infantry to six in the cavalry; and officers have six weeks instruction besides passing four weeks at a school of musketry; and both officers and non-commissioned officers attend "Cours de repetition" in the infantry for 16 days in alternate years and in the other arms of the service for 10 to 16 days annually. The courses for Staff and Engineer officers are longer and more severe and there is a special additional course for all adjutants.

The *Élite* cavalry, numbering 3758 of all grades, comprises eight dragoon regiments in three squadrons of 4 officers and 119 troopers each (including 9 non-combatants), as well as twelve troops of guides; there are also in the *Landwehr* 24 squadrons of dragoons and twelve troops of guides; the cavalry are mounted on horses, owned originally and schooled by the State; the trooper pays half the horse's value and has the use of it when not in service, but annually for 10 years receives one-tenth of its remaining value from the State and after ten years the trooper owns the horse outright; if the horse is injured in service the State replaces it, but if otherwise the trooper is responsible; the annual service of an *Élite* trooper covers 80 days.

The *Élite* artillery is composed of 48 light batteries of six guns, two mountain batteries of six guns, 10 batteries of siege artillery and four batteries of fortress artillery; in the *Landwehr* there are eight light batteries and two mountain batteries of four guns each.

There is an Engineer Corps of nearly 5000 men, as well as Corps of Sappers, Miners and Pontoniers and a well equipped Ambulance Corps.

The principal fortifications are at St. Gotthard and at St. Maurice, and there are older works at *Luzienstieg*; all these are garrisoned by troops of the neighborhood serving in turn and always trained there. There is a federal factory of arms at Berne, and at Thun ammunition is manufactured for all arms; at Thun is also situated the military riding school.

It is worthy of remark that enlisted men sit with officers on the Swiss courts-martial, which is quite in keeping with the purely democratic ideas prevailing throughout the country.

The Swiss soldier always appears alert and military, there is little ornament about his dress and naturally he lacks the smartness of the Prussian or English guardsman, but everything about him is thoroughly business-like and he compares well with French and Italian Regulars ; in case of a call to arms, he puts on his uniform, takes his rifle and emergency cartridges, and repairs to the nearest railway station ; his uniform is a pass on the railway and he is enabled to join his regiment almost at once ; by this method a perfect *levée en masse* of the population is secured in a remarkably short time. Many things in the Swiss service would be impracticable in our National Guard, but the system is interesting for comparison, and such exercises as marching movements and setting-up calisthenics in the Common Schools, and the compulsory instruction in rifle practice of the whole male population, would seem worthy of our imitation and would save much valuable time in breaking in possible volunteer levies in the future.

Reprints and Translations.

THE TACTICAL PRINCIPLES AND DETAILS BEST SUITED TO WARFARE ON THE FRONTIERS OF INDIA.

BY COLONEL J. P. C. NEVILLE, ASSISTANT QUARTERMASTER-GENERAL, MADRAS COMMAND.

(From *The Journal of the United Service Institution of India*.)

MOTTO :—MICHING MALLECHO.

Oph. What means this, my lord ?

Ham. Marry, this is miching mallecho ; it means mischief.

THE frontier of two-thirds of India being the sea, and a consideration of the best means of conducting warfare thereon being more a naval than a military problem, it is proposed in this paper to deal solely with the land limits of our Indian borders—that is to say—our northern and north-western frontiers.

The theatre of war in these directions is now so well known to Indian military students as to need but little description.

High, barren, inhospitable, and precipitous mountains, for the most part destitute of any woods or verdure, enclosing in their fastnesses green valleys, watered by the torrential streams descending from the main water-sheds, or, elsewhere, barren valleys of stones and boulders covered with low scrub and thorn jungle ; these are the prominent features. The valleys are much broken by ravines, which hamper the movements of cavalry and wheeled artillery. Roads, properly speaking, there are none. The inhabitants have no need of roads : a mere goat-track on the mountain side is to them sufficient as a means of communication between valley and valley, village and village. The main routes run for the most part in the bed of some mountain torrent, dominated on both sides by towering cliffs or a

succession of spurs ; they usually cross the ranges separating the different valleys at a saddle, or *Kotal*. These Kotals are for the tribes favorite defensive positions.

The inhabitants of these valleys are fierce and warlike tribes or clans of the Mahomedan faith. They are constantly at war with each other, but occasionally sink their differences, at the call of some zealous fanatical priest, to join in common issue against their natural (as they believe) enemy—the white-faced “Kaffirs” of Hindustan.

It will be at once evident that, in such a country and under such conditions, the methods and manœuvres most suitable for warfare upon the historical battle-fields of Europe will be useless and impracticable.

Our drill books, though admirable for the instruction of troops fighting on the plains of India, require several entirely new chapters dealing with the conduct of the three arms in mountain war.

Take, for example, the time-honored first principle of the necessity for deploying your force on a broad front as soon as the enemy is sighted. If the only approach to the enemy's position is a mule-track on which troops can only advance in double file, this first principle will require modification to suit the new conditions of the case ; and so on, with others.

But fortunately, owing to the lessons taught us by the late campaigns on our North-west frontier, we are now in a position to formulate the new principles and details requisite for such a contest, and already orders have been issued for the annual exercise of our troops, wherever practicable, in the elementary training so necessary to keep them always ready for employment against these redoubtable enemies at our gates.

The general subject of Indian frontier warfare, to be exhaustively treated, should be considered from three points of view, viz. :

(a) War with the frontier tribes. (Such as the late punitive expeditions.)

(b) War with an invading army, the frontier tribes being friendly ; and

(c) War with an invading army, the frontier tribes being hostile.

The last of these conditions involves questions more of policy and strategy than of tactics proper, for which reason but a very brief mention will be made of it.

WAR WITH THE FRONTIER TRIBES.

General Tactical Principles.—It will be well at the commencement to set forth the advantages over our troops which in some ways these tribesmen undoubtedly possess, and the difficulties in such warfare that we have to overcome.

1. To begin with, the enemy possess the immense advantage of being inhabitants of the theatre of war. They are intimately acquainted with the country, every by-path, ravine, and defensive position of which is familiar to them from childhood, so that they can find their way by night almost as easily as by day. They are thus enabled to lay ambuscades for our convoys, reconnoitring patrols, pickets, or any small detached parties, and surprises of this sort are amongst their most common tactics.

2. Being mountaineers, they have the advantage of a continual athletic training. Their agility in scaling and descending the most precipitous mountains is wonderful to behold, and they can cover the most broken ground in a way that the best of our troops cannot approach.

3. In these mountain regions the "Vendetta," or blood-feud, is an immemorial institution. The consequence is that there is scarcely a family of any importance which is not involved in one or more of these hereditary quarrels which extend to the third and fourth generation. From this fact, and the incessant inter-tribal petty wars which prevail, it results that every man goes abroad with his life in his hand. Armed with jezail or rifle, sword, and knife, he sees an enemy in every bush, behind every rock, lurking in each ravine. Continually alert to the danger which ever dogs his footsteps, he naturally becomes an expert skirmisher.

Taking advantage of every possible scrap of cover, even when engaged in the most peaceful avocations, he never exposes himself when concealment is possible. His very existence, moreover, depending as it does on the accuracy of his aim, he spends his spare time in improving his marksmanship;

the result is that there are no better skirmishers and but few better shots than these frontier tribesmen. With improved weapons, their skill in shooting has improved, and the experience of the late campaigns has taught us that to-day at medium, and even long ranges, they can compare not unfavorably with our best troops.

4. Another point in favor of the enemy is their lightness of equipment. Those whose homes are in the immediate neighborhood carry but their arms and a few rounds of ammunition which they carefully husband, having no reserves from which to replenish their pouches. Those who come from afar carry in addition a blanket which, wound round their waists by day, is but little impediment, and forms their covering at night.

5. Not the least in the list of the enemy's advantages is the prevalence among them of the spirit of religious frenzy, or *ghazi-ism*. These *ghazis*, who not only hold death in contempt, but even eagerly court it, under the obsession of their religious superstition, are usually chosen as leaders, and their desperate heroism renders them the most formidable of foes.

These are the men who lead the night-attacks against our camps, and who hurl themselves undismayed on our bayonets in the hope of future reward in the material heaven of the Mahomedan.

6. Lastly, in most cases, the enemy will have the superiority of numbers.

Alongside these advantages to the enemy must be set—first, the disadvantages under which we labor when fighting them; and, secondly, the superiority which we possess over them in certain ways—

(a) We are fighting in an unknown country, and although certainly of late our maps have been greatly improved, yet many details are still wanting, so that constant reconnaissances are needful, and the difficulties of preconcerted strategical movements are multiplied.

(b) Being dependent for food and shelter on what we can carry with us, our baggage train is of necessity very great, and as the transport animals, owing to the absence of roads, have usually to move in single file, the ground it covers on the march is excessive, and it is exposed through all its length to attack

by daring parties of the enemy; moreover, the necessity for getting the train safely into camp before dark prevents us from making any but the shortest marches daily.

(c) As the baggage must move on the roads (such as they are) and must be protected during the march, as must also the main body of the force, we are obliged to detach numerous bodies for the protection of our flanks, thereby causing much extra fatigue to our troops.

(d) As water is only to be found, as a rule, in valleys and low-lying ground, we are obliged to pitch our camps in such localities which are the worst suited for defense, and this gives the enemy a chance for night "sniping" into camp from the neighboring hills, which is harassing and spoils the rest of the troops. To safeguard against these night-attacks, numerous strong pickets have to be thrown out to considerable distances, thereby greatly increasing the night duties.

(e) Our troops, not being in the same constant training as the enemy, are slower in movement, and are much more easily fatigued.

Up to this point, all these things have been against us. Let us now see wherein we possess the superiority.

First of all, we have discipline whereby the many move and are controlled by the will of one. The enemy lack this greatest of military qualities. They are uncontrolled and uncontrollable. Each man endeavors individually to inflict as much damage as possible on the common foe, but he is his own commander; he takes orders from no man.

Then we possess cavalry and artillery, both of which arms have great moral effect, and neither of them have they.

We have, moreover, the best of modern weapons and ammunition and (or we ought to have, but it must be confessed that in this respect we are sadly deficient) the latest scientific inventions—such as captive balloons for reconnoitring, electric lights for camp defense, the field telegraph, heliograph, and many other such things, all of which give the possessors a great moral advantage.

We have also the prestige of former victories.

It will be evident, therefore, that—speaking in general terms—the physical advantages are theirs, and the moral ours.

This brings us to the first general principle, which is:

1. We should develop to the utmost our moral advantages in a warfare with an ignorant and superstitious enemy. At the close of the Cabul campaign of 1879-80, the Afghans came into our camps in a friendly way, and freely discussed the events of the war. They acknowledged themselves beaten, but declared that their defeat was accomplished by the heliograph, which they evidently looked on as a magical instrument. In a contest with an ignorant and superstitious people, it is ever the same story—it is the unknown—the incomprehensible, that paralyzes their powers of resistance.

It is very needful, therefore, if we would neutralize the advantages, already mentioned, which they possess, that we should freely make use of every new scientific invention calculated to be of use to us and to astonish them. The principal of these, which are now urgently required, are undoubtedly captive balloons and electric search-lights.

We should, moreover, provide our forces with the greatest proportion of mountain artillery and cavalry that can be utilized with advantage. We have seen in the late campaigns the moral effect of artillery fire in breaking down the enemy's defense, and the excellent effect of machine guns, both physical and moral, at Chakdara.

Cavalry too has a terrifying effect on mountaineers; and although the opportunities for the use of this arm may be infrequent, yet it is well to have some squadrons always at hand whenever an opportunity occurs.

The second broad general principle to be adopted is that:

1. Forgetting our previous notions of warfare, based on the teaching of our drill-books, we must adapt our tactics to the enemy's methods of fighting, and the nature of the country in the theatre of war. The tribes on our borders do not fight by the book. Their methods are guerrilla in nature.

Before a determined advance they melt away; during a retreat they crowd on our rear-guards; at night they infest the outskirts of our camps, "sniping" at the tents and baggage animals.

At all times they seem to surround our force, lying in wait to cut off stragglers, overpower detached parties and rob the

baggage trains. We must, therefore, adapt our tactics to meet these conditions. This will be treated on under "Details—Tactics."

Occasionally they make a stand, as at Dargai, and then they are easiest dealt with. This brings us to the third principle.

3. In attacking a position, the front attack should be supplemented by a movement on one or both flanks directed against the enemy's flank, and threatening his line of retreat. Experience has taught us that the tribesmen are always badly flustered by a flank attack, and begin to retire as soon as their line of retreat is threatened.

4. In this description of warfare, individual fire is preferable to volley firing. This point will be dealt with under "Details—Tactics."

5. In every regiment of infantry a proportion of men should be specially trained for scouting duties. In all reconnoitring work, whether for the purpose of discovering the whereabouts and movements of the enemy, or for the purpose of examining the ground to be traversed by the troops, the fewer men employed the better; but these few should be the best men for the purpose obtainable, and will need special training. The use of Gurkha scouts in the late Tirah campaign was found to be most advantageous. But it would be better still if every regiment had its own trained scouts, as it would then in all situations be independent.

These men, who should be selected for their physique and intelligence, should be specially instructed in reconnoitring duties, and a proportion in the elements of field sketching. They should be constantly exercised in hill climbing and other athletic exercises. For this purpose arrangements might be made to send them annually to the nearest hill depot. It would cost money, but it would be money well spent.

Some inducement might be necessary to attract the best men, and this might take the form of extra batta while actually engaged on field service, a small grant of extra pay in peace to cover wear and tear of uniform and boots, and some honorable distinctive badge to be worn on the uniform.

Scouts should be as lightly equipped as possible, and their greatcoats, etc., carried for them under regimental arrangements.

6. In operations beyond our frontier, medium sized, independent brigades are preferable to larger bodies of troops. We have learnt by experience that, owing to the absence of roads, the necessity for flank protection, the undue extension of the baggage train, and the urgency of reaching camp before dark, a brigade can seldom cover more than some eight miles in the day, and it is evident that, if an attempt is made to move a larger body of troops over the same road, the difficulties are greatly enhanced.

When a large force takes the field, it is better, if possible, for independent brigades to march on parallel or converging routes, care being taken to keep up constant lateral communication by signalling. Should this course be found impracticable, brigades should follow one another at intervals of not less than twenty-four hours.

7. For the better control of the baggage train the muleteers and drivers should be brought more definitely under military control. This matter, which is of the utmost importance, will be treated of under "Details—Transport."

8. For the security of camps at night a sufficiency of pickets must be posted to check the "sniping" of the enemy. After a hard day's work, it is most essential that the troops should have adequate repose. Without this they will very soon break down and be useless for fighting purposes. Owing to the improved nature of the enemy's weapons, the night pickets must be thrown out to much greater distances than heretofore, and must be strengthened, so as to be self-supporting and capable of resisting all night attacks until relieved at daybreak.

9. After any naturally strong position has been captured, it should, if possible, be held; but if it is found necessary to withdraw the victorious troops (for want of water, or other reasons), it is advisable to do so to the front (*i. e.*, the direction in which the enemy has retreated).

The reason for this is that to the ignorant tribesman any retrograde movement is an indication of weakness and fear.

He knows nothing of the "*reculer pour mieux sauter*" principle. If then we withdraw towards our base, the enemy are tempted, as at Dargai, to reoccupy the position in increased strength, and the consequence is a new fight for

the same ground, causing losses that might have been avoidable.

Of course this is not always possible, but when possible, it is very advisable.

10. During a march, if the rear guard is engaged, care must be taken that the column does not march away from it.* The natural anxiety of the commander to get his troops into camp in good time has on more than one occasion caused this important principle to be lost sight of, with the result that rear guards have been left behind unsupported and have had to remain out all night, causing much unnecessary loss and hardship to the troops engaged.

11. In rear guard actions, to insure the best results, the onus of protection should be divided amongst the troops. Rear guard actions are the most difficult and demoralizing of all phases of fighting, and the conditions prevailing on our frontiers render such combats more than usually trying to the troops engaged. The ferociously cruel atrocities, practised by the enemy on our wounded, makes it imperative to carry away all our casualties. As it takes four men (two carriers and two to carry arms) for each casualty, the fighting line is quickly depleted, and the supports expended in filling gaps. The rear guard therefore becomes from moment to moment less equal to its allotted task, which greatly increases the difficulties of the commander, and acts unfavorably on the spirit and morale of the troops.

Moreover, it has ever been in these rear guard actions that our heaviest losses have occurred.

For all these reasons it is very advisable that the strain on the rearward unit should be relaxed in the earliest reasonable time.

The men will fight all the better and more cheerfully if they have the expectation of being relieved within a given period—say an hour—and the strength of the rear guard being doubled at the point of relief, the enemy will sustain a sensible check and, it is to be hoped, considerable losses.

* If the scheme of the next general principle be adopted, this No. 10 may be expunged as it will be no longer needed.

For details of the scheme, see further on under "Details—Defense—Rear-guard Actions."

12. During a march in the enemy's country, the safety of the baggage and ammunition train should be the first consideration of the commander. This is very important. The ablest generals are the most careful for the comfort of their troops, knowing how much on this their fighting qualities depend. Every casualty in the baggage militates against this desideratum, and the importance of preventing ammunition from falling into the enemy's hands is so obvious as to need no comment. Yet, in the face of these facts, there seem to be many who hold that it is more important to reduce to a minimum the number of flank guards and to keep the bulk of the fighting force on the road. This is the old leaven of the drill book. Should opposition be encountered during a march in a hill country, the road is perhaps the very worst place where the main body could be posted, for, as we have seen, the roads run generally in the bed of a water-course, through some ravine, and are dominated by heights on both flanks. For fighting purposes, therefore, the troops would be far better placed on the heights than on the road. This matter will be further discussed under "Details."

Another point to be considered is the moral effect on the enemy of the capture of any of our baggage and the cutting up of a few *drabis*. They are apt to magnify such petty successes in their boasting until, in their tribal traditions, they become important victories. It should be our care to prevent this.

The foregoing twelve general tactical principles do not, of course, comprise the whole sum and substance of frontier warfare. It has been found convenient to place them first, as being of broader and more general application than those which follow, and to include the rest under the next head.

DETAILS.

I. RECONNAISSANCE.

Owing to the enemy's methods, already briefly sketched, all major reconnaissances must be in force, otherwise we run the risk of having our scouts cut off and massacred.

This does not, however, affect the rule that the fewer men in the actual line of observation the better. It is to selected

officers that the commander will look for the requisite information. These officers, who should not be distinguishable by their dress, will move in the advanced line of scouts. This line should be supported at a distance varying with the nature of the ground (but not more than 400 yards in the most open country) by companies or half-companies in skirmishing order upon whom they can fall back if attacked. These troops will again be supported in rear by larger units, which should endeavor to keep concealed from view. Further to the rear must follow a reserve sufficiently strong to disengage the advanced units and secure the return of the whole in safety.

The force should be as lightly equipped as possible and have no transport animals of any sort.

A reconnaissance being for purposes of observation, and not for fighting, the place of the artillery will be with the reserve.

The cavalry in a hilly country will be chiefly employed in conveying orders, but in addition they will be found most useful in exploring side valleys which may be opened out during the advance.

The following are some of the chief points with which commanders should concern themselves:

Officer commanding reconnaissance should clearly understand what the General Officer Commanding requires to be done, and should make his plans accordingly. He should assemble his officers and explain to them clearly the nature of the duty to be performed by the column.

The general tactical principles to be borne in mind are—

(a) No fighting that can be avoided.

(b) No delay.

(c) The capture, if possible, of prisoners.

It should be impressed on all commanders that the less firing that takes place the better.

If fighting is forced on him, the officer commanding must make the best dispositions he can to disengage and retire his force.

Once set in motion, the reconnaissance should push forward as speedily as possible, so as to reach its objective point and get back before dark.

Every endeavor should be made to capture prisoners, and it

must be remembered that more information is often to be obtained from women and children than from fighting men. As the tribesmen, however, before going on the war-path, generally send their families to some distant place of safety, such captures are not to be expected.

The normal position of the commander is at the head of the reserve.

Officer commanding Royal Artillery should carefully reconnoitre suitable positions for his guns if obliged to cover the retreat of the force.

To aid in this duty he should have a small party of selected non-commissioned officers and men from the cavalry placed under his orders. He should also ascertain, as far as possible, the ranges of prominent objects to the front from such positions. He should be careful to retire his guns in good time, to prevent being cut off, as his most effective positions will usually be some distance off the route.

N. B.—An infantry escort should always accompany the artillery. Officer commanding cavalry should dispose his force most suitably to the nature of the country. Where the road runs through a ravine, a small advanced-guard should move level with the line of scouts to bring back messages; connecting files will follow, and the main body be kept well back. If a valley has to be searched to a flank, he should first inspect the approaches himself, and then tell off the searching patrols as may be necessary. If a valley is opened out ahead, the cavalry will move rapidly to the front and form a reconnoitring screen. Connecting files should be maintained between the line of observation and the head of the reserve.

Officer commanding line of observation will be the senior officer detailed for observation, and may perhaps belong to the Intelligence Branch of the Quartermaster-General's Department. He will explain the objective point to his subordinates and control the direction of the advance.

He should tell off his scouts in pairs or groups of three, who must be careful to keep well extended. He will instruct the scouts to move as rapidly as possible over dead ground (*i.e.*, hollows from which nothing useful can be seen) and to pause and carefully observe from all crests and commanding positions.

He and the officers under him will note in their pocket-books all information acquired, all of which on his return he should compile into a general report for the General Officer Commanding.

One officer at least should be told off to make a sketch of the ground covered: he should have a couple of orderlies to assist him.

It is desirable that a signalling party should accompany the line of observation. It should be divided into three groups, one with the officer commanding in the centre, and one on either flank. In this way orders can be passed quickly and silently.

The signal parties should be a little in rear of the line and should not use the flag on crest lines or in positions from which they are likely to attract the attention of the enemy.

Minor reconnaissance.—Owing to the extremely difficult nature of the country, all advances and retirements should be preceded by a few ground scouts who should carefully look out for the easiest and best ground for the movement. For this duty active and intelligent men should be selected; they will not, however, require any special training.

II. MARCHES.

The general principles of marches in the plains hold good for these mountain regions also, but with certain modifications, owing to the undue extension of the column of march, the difficult nature of the country, and the enemy's methods of fighting.

To begin with, the pace will be slow. Owing to the difficulties of the road, and the frequent necessity for closing up the column, the advanced-guard must make constant halts, and these halts, it must be remembered, should not, as in a flat country, be regulated by time but by suitability of situation.

The utmost, therefore, that can be fairly expected on a good (for the country) road is two miles, and on a bad road, one mile an hour.

It will be evident, therefore, that marches must be short, and that they should commence as soon as it is sufficiently light to see distinctly. All the troops and baggage should therefore be formed up before daybreak, so as to be ready to move off without the least delay. The divisions of the column will be as in

the plains, *i. e.*, Advanced-guard, main body, baggage and baggage guard, rear-guard.

The advanced-guard should be sufficiently strong to be able to hold its own if suddenly attacked at any point on the road, and besides to supply flanking parties, if the commander decide that these shall be supplied by the advanced-guard. As a rule, however, the opposition to be expected by advanced-guards will be slight. Small parties of the enemy will fire on them as they advance, and these must be dislodged. When they have determined to make a stand and fight it out, their plans and movements are generally known to our Political Officers beforehand through our spies.

A proportion of cavalry should accompany the advanced-guard. When the ground allows of it, they should be pushed to the front; when the situation is unfavorable for their action, they should follow the advanced formed body of infantry, ready to resume their position in front immediately opportunity offers.

Troopers will be useful to the officer commanding advanced-guard in sending back messages.

As a rule, artillery will not be required with advanced-guards, but it is important that they should be accompanied by a party of sappers or pioneers for the purpose of improving bad places in the road which might be a source of danger to the baggage.

Flankers.—Owing to the unavoidable extension of the column, the principal care of the commander will be the protection of his flanks, especially (as we have seen under "General Principles") those of the baggage and ammunition train.

The troops can look after themselves, however attacked; the transport drivers cannot; they are singularly helpless, and much inclined to panic, and it is imperative, for reasons already given, that their march should be completely protected. The baggage guard alone will be insufficient for complete protection, the danger not being of attacks in force, but most frequently of daring raids by small ambuscades.

Where the road lies along the summit of a ridge, all will be usually safe, as the enemy seldom venture to attack at a disadvantage up hill. But where, as it far more often happens, the route lies through a ravine dominated on both sides by heights.

presenting under-features of alternate spurs and nullahs, it will be a different matter.

Here the enemy will have every opportunity for ambushes, and these must be guarded against by flanking bodies of troops. As ground will seldom be found over which such flanking parties can move so as to keep pace with the column, however slow its progress, the best course to adopt is to send out from the advanced-guard pickets, whose strength will depend upon circumstances, which remain stationary, guarding the flanks until the whole column has passed, and then join the main body of the rear-guard, which, in this way, is being continually reinforced as the march proceeds. The number and strength of these flank pickets will depend on the length of the column and the amount of opposition to be apprehended.

In all cases, even if the whole fighting force has to be utilized (*i. e.*, the "main body") the march of the baggage train should be made as secure as possible.

As the advanced-guard will not always be equal to the strain of providing flankers in a very difficult country, it will often happen that detached bodies of troops must be utilized on the flanks.

The camp-color men will usually march in rear of the advanced-guard.

The telling-off of advanced-guards is as for a plain, but the advanced party will move by groups, extended, and not in line.

On arrival at the camping-ground the officer commanding advanced-guard will immediately throw out day pickets. Where the situation of the camp admits of it, cavalry may be used for this duty, but if attacked, they should be replaced by infantry.

These pickets should remain out until relieved by the regular night pickets.

The Main Body.—The artillery, preceded by its escort, should move at the head of the main body, which should have a proportion of cavalry attached for conveyance of orders.

Each battalion should be immediately followed by its first reserve of ammunition, stretchers, and water-supply on ponies or mules; also its medical mule-trunks.

The normal place of the commander is at the head of the main body.

The Baggage Guard.—Baggage guards should be normally disposed, *i. e.*, advanced and rear guards, with one or more strong parties in the centre, and a few connecting groups of not less than a section. The advanced party should follow the main body, well closed up.

It should have a party of cavalry attached for the transmission of messages, as should also the rear-guard of the column.

The usual disposition of the baggage train is as follows:—

The 2d reserve of ammunition.

The field hospitals.

The staff baggage.

The baggage of units in their order of march.

The commissariat.

The engineer park.

All baggage guards should move with fixed bayonets and magazines loaded, ready to meet any sudden rush or surprise.

Details regarding the better control of drivers (General Principle No. 7) will be found under "Transport."

The Rear Guard.—In frontier warfare the command of the rear-guard is ever the post of honor, and as such is eagerly sought after.

The commanders, however, of rear-guards should be carefully selected—not so much for their bravery, which happily is a very general qualification amongst our officers, as for their experience, aptness for command, readiness of resource, shrewdness, and common sense.

Experience, of course, will not always be forthcoming, but the other qualities will.

The officer commanding must ever be mindful of the responsibilities of his post. He should regulate his pace, as far as possible, to that of the baggage. The retirement will be carried out by successive bodies or lines passing through one another and taking up fresh positions in rear. A junior officer should be detailed to take command of the flank pickets joining the rear-guard until such time as one of their own officers arrives to relieve him. This officer should see that the pickets retire in time to prevent being cut off. For further details, see "Rear-guard Actions."

Halts.—Halts should be frequent to allow of closing up.

They should take place after a steep ascent or a very bad bit of road has been passed, and should be of sufficient duration to allow some rest to the rear as well as the head of the column.

Halts should be avoided in ravines or confined situations where the troops could be taken at a disadvantage by the enemy.

Staff Duties.—An officer of the Quartermaster-General's Department should accompany the advanced-guard.

His duties will be to select the best site for the camp, and allot their respective positions to the various units. He will select the best positions available for water-supply to men and animals, taking care that the latter is down-stream, and post a guard over the former. He will point out their various sites to the non-commissioned officers of the camp-color parties, showing them the exact direction of their front. This officer should be supplied with a group of mounted orderlies.

On approaching the site of the camp, an officer of the Adjutant-General's Department or other selected staff officer should push on with a cavalry escort to select the best positions for the night pickets.* This is the more necessary, as the amount of day-light remaining will be limited.

III. ENCAMPMENTS.

To find a suitable camping-ground for a brigade of all arms in a mountain region is a matter of difficulty. The best must be made of the locality, such as it is, where the halt is decided upon.

The principal consideration is security.

The ideal camp would be situated on a plateau, uncommanded by any surrounding heights, which, with the minimum of time and labor, could be converted into a strong redoubt.

Such ground will be seldom found: the selection will be governed by considerations of water, grass, firewood, etc., and, as before said, the best must be made of the locality.

In the accompanying illustrations, which are from photographs taken during the Tirah campaign, some camps will be

* It would be a mistake to leave this duty to the Field Officer of the day, who taken from a general duty roster, might not possess the necessary qualifications.

seen which indicate clearly the many disadvantages of the sites which it was found necessary to occupy.

On reaching the site chosen, the brigadier will select the positions for the night pickets in consultation with the staff officer, just mentioned, who has preceded the column.

These pickets should be provided by the units opposite to whose front they are situated, as a rule, but this is nowise imperative: their position should be carefully noted while it is yet daylight, and some indicating points arranged, so that, in case of a night attack, the troops shall not fire on their own pickets.

In like manner the pickets must be careful not to fire in the direction of the camp. He will then tell off alarm posts, giving to each unit its section of defense. In-lying pickets will be detailed as may be requisite; and positions for unit latrines selected (by their respective quartermasters).

The out-lying pickets should entrench themselves with a stone breast-work, or take advantage of houses that may be conveniently situated, by putting them in a state of defense. If brushwood is available, the posts may be further protected by abattis. In positions, where the camp is liable to annoyance from sharp-shooters, they should be pushed out to a considerable distance, as 800 or even 1000 yards.

They will then be able to afford better protection than if close to camp, and if sufficiently strong, may be able to surprise some of the "snipers." This has been found to have the best effect in stopping this form of nocturnal annoyance.

As soon as their respective sections have been assigned them, officers commanding units should make the best arrangements possible for their defense by building breast-works, digging shelter-pits, etc.

If the halt is to be prolonged over the night, these can be improved the following day.

Security.—The subject of security for camps in mountain warfare is one which more particularly applies to standing camps. The tribesmen seldom venture to attack in force unless they have first made themselves thoroughly acquainted with the geography and defenses of the camp.

This they can seldom do in the case of a temporary camp

of a brigade or division, but it is different with standing camps. Here in the disguise of peaceful venders of provisions, commissariat employés, road-making coolies, etc., the enemy's spies freely penetrate our lines and make a careful note of the forces and their disposition, the defenses and their weak points, as well as the places where ammunition is to be looted. Moreover, after a time of tranquility, standing camps have been depleted of troops until the force left has been inadequate to their requirements for defense, and this gives the enemy an opportunity for a sudden outbreak, such as that on the Malakand in July, 1897. The first general principle for the defense of such camps is—

That the outer line of defense should be proportionate to the strength of the garrison.

The greatest safe extent of the outer line should allow of one man per yard with a third of the garrison in reserve.

If the garrison is reduced, the line of defense should be at once curtailed so as to be suitable to the means of the remaining available force.

The scattering of units on detached hills should be avoided.

The position selected for defense should be one to every portion of which the reserve will have easy access, and roads should be constructed to facilitate this.

The magazine should be in a central position, so as to be guarded by the reserve in case of attack.

In this central magazine should be stored the reserve ammunition of units, and not in quarter-guards, where it is liable to capture, as at the Malakand when the enemy took the quarter-guard of the Madras Sappers, and looted 10,500 rounds, together with 19 mules.

Only such ammunition as the men can carry on them and which can be quickly distributed to companies should be kept in quarter-guards.

In these standing camps we have the best opportunity for developing to the greatest extent our moral advantages referred to under "General Principles."

They should be provided with all such modern inventions as are calculated to overawe an ignorant and superstitious people and to be of the greatest use to the garrison. Of such are captive balloons, electric search-lights, telephonic communications,

machine guns, shell fougasses, and mountain artillery. The first of these has not been mentioned in connection with reconnaissance, although for such purposes its use would be of incalculable value, because of the great difficulties (in the present imperfect development of the machine) of transport and manipulation.

But in standing camps, with their military roads to the base of operations, there can be no reason, except the untenable one of expense, for not utilizing this invention.

A captive balloon with an ascension in calm weather of 3000 feet would be of the greatest use when disturbances are to be expected, in showing the movements of the enemy from a great distance, to say nothing of the moral effect on the tribesmen of this novelty, by which they could not fail to be impressed.

Besides observation, however, there is another use for such balloons.

By a recent invention * they can be made luminous by the inclusion in them of electric lamps connected with a battery on the ground by a wire running through the rope. By means of an ordinary telegraph key, an operator below can switch on or off the light, and thus signalling by night can be carried on for hundreds of miles.

Electric search-lights in the principal salients of the defense should also be considered indispensable munitions for a standing camp. These should be placed on small turrets suitably armored for the defense of the manipulator. The dynamos can be driven by portable oil engines at a very trifling expense.

Each section of the defense, moreover, should be in telephonic communication with a central post from which the commander can issue orders and where he can receive intelligence.

Machine guns are most useful for repelling night-attacks; more so usually than artillery (though the use of the latter should by no means be neglected). They should be placed so as to command the principal approaches.

Every standing camp should be protected by entanglements at a distance of from 50 to 80 yards from the breast-works. It

* Patented by Mr. Eric Stewart Bruce of London.

would be well to improve such defenses by a free use of the old-fashioned "shell-fougass."

Though old to us, these infernal machines would be new to the enemy, and a few explosions during a rush would render them duly cautious in repeating the attempt. There are in our Indian arsenals many thousands of old 6-inch and smaller iron shells which could be utilized for this purpose.

The charge should be moderate to prevent danger to the defenders from splinters. The shells are exploded by being trodden on.

With an accurate table of ranges, and the aid of the electric light, artillery can be used with great effect by night as well as by day, and its value thereby doubled, as at present it is but of little use at night.

Defenses.—Unlike temporary camps, the defenses should by no means be left to officers commanding units, but should be carefully laid out by an experienced officer, in the nature of a field work, or line of works. Particular care should be given to the provision of flank defense for each face, and if carefully laid out, there should be no dead ground.

For defense against night attacks the troops occupying the flanking defenses should, if possible, be armed with magazine rifles, as nothing is more demoralizing to a rush than a rapid flanking fire.

Protection of Horses and Baggage Animals.—If the camp is properly situated, it should be nowhere commanded, but should itself command the approaches.

In such conditions the protection of the cavalry horses and baggage animals is comparatively simple. A trench some 2 feet deep and 12 feet wide placed 6 feet in rear of an ordinary 4' 6" breast-work, where such work is on the crest of a slope, would give protection from fire directed against the breast-work. As cavalry are of no use by night as such, and as the horses are very liable to panic, their camp should be situated in a reëntering angle; where they will be less liable to attack. The baggage animals likewise should be placed in trenches similarly situated. But in positions where they must necessarily be exposed, they should be placed inside a *zareeba* made of bags of grain, sand-bags, or such material as may be available,

which should be used to heighten the surrounding stone breast-work.

Detached Posts.—Detached posts should be properly constructed.

If they are considered to be necessary, no expense should be spared to make them safe. The fate of Saragheri is still fresh in our memories, and that of the never-to-be-forgotten gallant twenty-one, who died the victims of its faulty construction.

Alarm Posts.—In all encampments the men should be perfectly acquainted with their alarm posts, and should be paraded at their respective sections of the parapet as a practice, so that even on the darkest night they may be able without confusion to fall into their proper places.

The Defense of Breast-works.—It cannot be too carefully impressed on the troops that the secret of success in the defense of breast-works by night or day is that no man must move from his post without orders. When the enemy makes a rush at a portion of the defensive works, the natural impulse is for the defenders to forsake the parapet and group themselves together for mutual defense.

This enables the assailants to get over the parapet with impunity, and once inside, confusion, and if at night, too often panic, ensues.

If, on the other hand, every man remains steady at his post (and it should be impressed on him that it is his duty to die there rather than move without orders), the enemy, receiving a check at the parapet, can easily be shot down at close quarters, or if they attempt to scale the wall, can be bayoneted. If the assailants are in overwhelming numbers, support to the threatened point must be given by the section reserve, and every section of the defense should have its own local reserve for this purpose.

IV. TACTICS.

We have seen in the 2d General Principle that we must adapt our tactics to the methods of the enemy. In this necessity history but repeats itself, for in the last century when our troops, at war with the French in Canada, found themselves confronted with hordes of Red Indians in the service of the enemy, they were forced to do the same thing. The frontier

tribes fight on guerrilla principles. They fire from behind cover by single men or small groups, and thus present an extremely difficult mark to aim at, and it must be evident that any sort of close formation on our side must be avoided as affording them an excellent target.

The whole question then of the successful conduct of such warfare resolves itself into one of good and accurate individual shooting.

Volley-firing against such an enemy (except on rare occasions) is a useless waste of ammunition.

What is required is a skirmishing line—well extended—of skilled marksmen, accustomed to shoot at a quickly disappearing mark. The first general principle then of our new tactics I take to be—that except for defense, or the assault of a position, only our best marksmen should be placed in the first line.

The more carefully I examine the subject, the more am I convinced that in this principle lies the secret of future success in this description of fighting; and as these frontier regions will, in all human probability, be the theatre of the wars that are likely to occur in the future of the Indian army, it would be wise to prepare our organization accordingly.

I therefore strongly advocate the formation in every infantry battalion, British and Native, of two light companies, to be composed entirely of marksmen.

The first requirement of the soldier is good shooting, and any measure of reform calculated to improve the musketry proficiency of the army deserves the careful consideration of the military authorities.

Although of late there has been a marked improvement in musketry, yet I think much remains to be done. The rewards for good shooting are insufficient; the amount of ammunition allowed for practice is inadequate, and the status of the marksmen is not made enough of.

My proposal then amounts to this—collect the marksmen, now scattered through the regiment, and make them into two *compagnies d'élite*.

Let it be generally understood that these companies are the pick of the troops: give them in peace some handsome addition to their uniform; let them march at the head of the regiment,

and in every way uphold their superior status. Let their officers likewise be carefully selected for their general smartness, zeal, and athletic training, and the competition for enrollment in them that would arise could not fail to enormously improve the shooting of the army. Being intended for service in the first line in mountain warfare, these companies should be as lightly equipped as possible ; in fact, excepting havresack, they should carry nothing but their arms and ammunition, everything else being carried for them on regimental transport. The animals should be the pick of the transport, and every care should be taken that they are well up on the march, so that the fighting companies shall suffer no inconvenience from the lightness of their equipment.

Should this scheme not meet with the approval of the authorities, I would still strongly urge on brigadiers the formation in each of their infantry battalions of temporary light companies while on service beyond the frontier, for the reason that marksmen alone are the fittest for employment in the first line.*

Have we at present sufficient marksmen to make up these companies ?

From the latest Musketry Returns, 1897-98, it will be seen that in British infantry regiments, on war strength, the average number of marksmen is 176, so that, by the addition of 24 first-class shots, two companies of 100 men could be formed.

In the Native army the shooting is not so good, so that, taking the battalions all round, we could only hope for 115 marksmen. However, they vary much in proficiency, for in eleven battalions of Gurkhas, on war strength, the average is 173. If, however, the scheme of these light companies were adopted, the increased competition could not fail to produce corresponding good results, so that in time we could be certain of having always at least our 200 picked marksmen in every battalion.

Our general system of tactics then should be to oppose marksmen with marksmen ; to cover the advance of our main force by a screen of picked shots, who, advancing from cover to cover to decisive ranges, should establish themselves in the best

* The term "first line" must be taken to include the various duties of Advanced and Rear-guards, Baggage and Convoy guards, etc.

positions available and keep down the enemy's fire, thus enabling the assaulting forces to advance to within striking distance of the position.

The artillery should aid the infantry attack by shelling the position, and immediately before the assault should concentrate the heaviest possible fire on the points selected for attack.

The front attack should be supplemented by a movement against the enemy's flank, threatening, if possible, their line of retreat.

Our cavalry, if the manœuvre is practicable, should endeavor to make a *détour* round the rear of the position where there may possibly be open ground suitable for their action.

V. ATTACK.

It may be assumed that the enemy's position will be on the top of a hill, and, further, that it will be one of great natural strength.

If the flanks of the position rest on impassable obstacles, such as precipices or inaccessible cliffs, it will be advisable to merely feint in front while endeavoring by a flank movement to turn the position.

Front attacks require numerical superiority and involve heavy losses.

The best form of attack would be from front and flank simultaneously.

As turning movements will have long distances to cover, and often the most difficult natural obstacles to overcome, care must be taken that such detachments move off in good time. It is also most important that communication by signalling should be maintained between the different attacking forces.

Before any forward movement is commenced, the ground to be covered should be carefully reconnoitred by scouts. Should this reconnaissance be checked by the enemy's outposts, the light troops (marksmen) of the advanced guard should be extended and pushed forward to drive them in. The neglect of this preliminary examination of the ground might result in the attacking force finding themselves confronted by some impassable obstacle which was invisible from their starting point.

Positions should be selected for the artillery from which

they may be able to bring the most effective fire to bear on the position without interfering with the attacking force. The officer commanding Royal Artillery should cause other positions to the front to be reconnoitred in case a forward movement of the guns should be found advisable during the action.

In advancing to the attack, the pace must not be forced. The men will require all their breath and energies for the final assault.

The first line, as previously indicated, should be composed of picked shots. In ascending a hill the supports and reserves can often be brought much closer up to the firing line than on a plain, and can often cover the advance of the first line by firing over their heads.

Spurs will be found the easiest and most suitable approaches to a ridge; moreover, from these a cross-fire can be directed against the enemy's breastworks lying between—an effective method of dislodging them.

The company, and not the battalion, should be considered as the unit of attack.

The light companies of each battalion in the fighting line should cover the advance of as many companies as the spur, or other avenue of approach, will conveniently hold, and these companies should as a rule advance, as much as possible, under cover (always extended) without firing, though, as shown above, they may occasionally be able to make use of long-range volleys against the position. The remainder of the battalion should follow as a reserve, or a whole battalion may be retained as reserve to a brigade—there is no “normal” formation possible in mountain warfare.

On reaching the position where the light companies have established themselves, the supports will come into action, carrying the first line with them as they advance. On nearing the crest, bayonets should be fixed, as here a charge of *ghazis* is to be expected; the reserves should move up as close as possible, and some time should be allowed the troops to take breath before the final assault, which should be delivered simultaneously by sound of bugle all along the line. Cheering should not be encouraged, as it takes away the men's breath just when they have most need of it all. Should a charge of swordsmen occur,

it must be met by steady individual fire, but there must be no giving way, and this should be strongly impressed on all ranks.

The commander should be careful to allow sufficient time for his flank attack to develop itself before ordering an assault.

If the signalling arrangements are successful, he can regulate this to a nicety.

During the ascent officers should carefully note the features of the ground in case of a retirement being ordered, which, as we shall see presently, is one of the most difficult of manœuvres.

In the event of the assault failing, the reserves should take up a defensive position on the most convenient under-feature, behind which the companies can re-form.

If the position is carried, the companies should be at once re-formed and as hot a fire as possible directed against the retreating enemy.

After a successful assault, the first care of the commander should be the issue of ammunition to the troops who have been engaged, many of whom will have empty pouches. His next should be the removal of the wounded, and the careful collection of the arms and ammunition of all casualties, so that nothing shall fall into the enemy's hands.

The question of ammunition supply during an action is one deserving the close attention of commanding officers.

When the mules can no longer keep up with the troops, the boxes should be opened and the packets distributed to the reserve.

Much more might be written regarding "attack," but as no two actions will ever be alike, it is better not to multiply details, but to leave them to the discretion of the General Officer Commanding and the officers commanding units, who must exercise their individual judgment and common sense; in this description of warfare a grain of experience is worth a bushel of book knowledge.

VI. DEFENSE.

The defense of standing camps has already been treated of: there remain, however, under this head two sub-sections deserving our notice—Retirements and Rear-guard Actions.

Though melting away, as we have seen, before a determined advance, the enemy, on the first sign of a retirement, seem to spring as if by magic out of the ground, and attack our rear-guard with great determination and valor.

Retirements are therefore the most difficult of operations and must be conducted with care and skill.

The enemy, having an intimate knowledge of the country, will use this in endeavoring to cut off any detached parties.

Scouts therefore should be freely used to examine the ground over which the troops must retire and give timely warning of difficult places.

Advanced-guards should always be formed as well as rear-guards.

In case of unknown ground having to be traversed, a party of sappers or pioneers should accompany the advanced-guard.

When the force is accompanied by its baggage, it should follow the advanced-guard: the artillery should follow the baggage. The cavalry must be disposed according to the nature of the country, taking care that small parties for conveying messages are left with the advanced and rear-guards.

In withdrawing from a position down hill, the spurs should be followed, as in ascent, as from them an effective cross-fire can be maintained.

All retirements should be by successive bodies. Those actually retreating should do so as quickly as possible and take up the best defensive positions available to cover the retreat of the remainder.

In withdrawing from a hill, the scouts, as the most active men, should be extended and keep up a continuous fire while the remainder rapidly retire.

As soon as the latter have cleared the hill, or reached a defensive under-feature, the scouts should descend as fast as possible, without halting to fire.

If the enemy is in great strength, arrangements may be necessary to cover the retirement by artillery and long-range fire.

In all retirements, ravines should be carefully avoided, even if they should seem to offer a favorable cover.

Rear-guard Actions.—The difficulties attending rear-guard

actions have been briefly mentioned. As the rear-guard should be able to devote all its attention to its front (*i. e.*, the rear of the column), it is essential that its flanks should be protected. This is best performed as described under "Marches—Flankers."

Under "General Principles" (No. 11) it is propounded that, to insure the best results, the onus of protection should be divided. I will now explain how this may be done.

Suppose a brigade consisting of

Squadron	1
Mountain Battery	1
Sappers	1 company.
British Infantry	1 battalion.
Native "	3 battalions.

Under this scheme a force of three companies will be sufficient to form the rear-guard.

The infantry battalions being distinguished as Unit A, B, etc., will show the distribution of the force, with its baggage, etc., on the march.

In accordance with a scheme to be discussed farther on under "Transport," one company from each unit, except A, is shown employed in controlling the baggage drivers.

Unit A will be entirely occupied with its duties on advanced-guard and providing flanking pickets.

Units B and C will each have half the battalion with the main body and three companies each in rear of all the baggage, immediately preceding the rear-guard.

On the rear-guard becoming seriously engaged, orders may be issued for its relief at stated periods, say hourly. At the appointed hour, a new rear-guard would be thrown out by the three companies of Unit C, immediately preceding, who would sustain the fight for one hour, the relieved rear-guard passing through them and falling into their place in the column.

In like manner, the next hour Unit B would relieve Unit C, which would follow in rear of Unit D, and so on in rotation, the three units alternately relieving one another at periods of an hour.

Each of the three rear-guard units should be provided with a proportion of stretchers and ponies for the conveyance of the wounded.

If considered absolutely necessary, the relieved flank pickets of Unit A may be ordered to fill gaps caused by casualties in the other units, but this, if possible, should be avoided, as they will already have completed a fatiguing duty.

As one marksman in a rear-guard action is worth three bad shots, the light companies are the best suited for this kind of fighting.

The advantages of this scheme are five-fold—

- (1) Great stimulant to the morale of the fighting body.
- (2) Increased care and protection for the wounded.
- (3) Increased safety of the baggage train.
- (4) In the event of the main body marching away from them, the rear-guard, consisting virtually of nine companies instead of the usual four, will be sufficiently strong to disengage itself from any ordinary situation, and to retire in good order into camp, without the danger of being left out for the night.

(5) Our casualties have always been heaviest in rear-guard engagements. By the above arrangement the losses would be distributed amongst units and not fall entirely on one battalion.

VII. TRANSPORT.

Of all the difficulties which beset the organization of expeditions beyond our frontiers, "Transport" is the most troublesome; and happy is the commander in mountain warfare who has not cause to curse his transport at least three times a day.

To begin with, there is the difficulty of procuring the necessary number of animals; then there is the impossibility of providing the requisite number of drivers, so that frequently impressment has to be resorted to, and a pressed man is proverbially of little use.

Although carts, bullocks, coolies, camels and ponies can be utilized on lines of communication and in places where roads exist, they are none of them, except the latter two, of any use in a mountain tract. Camels have been used on a pinch, but are bad travellers in the hills; ponies are inferior to mules, but are the best substitute. The only dependable animal is the mule.

The present system of having but one driver to three mules is a bad one; but, owing to the difficulty of procuring even this

proportion, I do not propose an increase, but would merely observe that if three mules must be linked together, the worst (*i. e.*, weakest) should be in front. The heart is taken out of a good mule by having to drag after him a weakling; it gives him double work. Then also in bad places on the track if the best mule is in front, he is apt to drag over the other two, so that frequently they stumble and their loads become displaced—hence sore-backs.

The troubles of the commander are not, however, caused by the animals, but by the drivers. This unarmed rabble of, too often, unwilling men becomes panic-stricken when an attack occurs; they either forsake their animals, or drive them wildly hither and thither—off the road—into ravines (where they are often ambuscaded)—across paddy-fields, thinking to make a short-cut, or down by-paths with the same view, whereby they often become benighted or lost. At all times, even when there is no fighting, it is most difficult to make them march in the formation ordered, or abstain from crowding and jostling each other at difficult places, whereby, on numerous occasions, animals have fallen over precipices.

The following extract from a description of a march in the Bara Valley from "The Risings on the Northwest Frontier, 1897-98" (*Pioneer Press*), will give an idea of what actually takes place during a contested march:

"The enemy pressed the rear guard and flanks of the baggage from the first, the mist which prevailed enabling them to creep close up unobserved; the ground except in the stony bed of the stream was heavy and yielding, and the cold and wet combined with the constant fording of the stream seemed to deprive the mule-drivers and followers of their senses and to leave them with one idea only, *viz.*, to press along as fast as possible, quite regardless how their animals or loads were getting on, and to escape the enemy's bullets constantly flying over their heads. Some extraordinary scenes ensued. Brigadier ——— called several halts in order to close up the transport and rear guard, and to send out fresh troops to guard the flanks of the line of march. * * * The moment, however, the head of the column moved on, the wave of transport swept on after it like a pent-up stream suddenly released, spreading out sometimes to a

front of half a mile or more ; every man pushing blindly forward, all anxious to avoid fording the river, in places knee-deep, and all acting on the principle of 'each man for himself and the devil take the hindmost.'

"Twenty times the number of transport officers could not have controlled this seething mass: it was an indescribable jumble, sometimes all jostled together on a front of 100 yards, and sometimes spread out to a width of over 800 yards.

"Those who took short-cuts across country, despite every endeavor of the transport officers to stop them, seemed to be gaining ground at first, and others madly followed them ; so that everywhere were animals either bogged or slipped up in ditches with their loads under them, or with the chain broken between them and the leading animal, while the *drabi*, all unconscious, pressed on blindly. Where soldiers, British or Native, were with the animals, the situation was of course different, and the *drabi* could then be stopped, but only by main force. * * * Darkness now came on rapidly, the rain continued, the road to camp was difficult to see, and many *drabis* stupidly made a bee-line for the lights. Most of these animals and loads got eventually lost. * * * Many drivers deserted their animals * * * while some kahars either broached a keg of rum or found one already broached, and got hopelessly drunk. * * * Next morning between 100 and 150 animals with their loads were missing, and one unit lost as many as 50 animals."

This graphic description tells its own tale and points the moral—how very essential it is that these drivers should be brought under proper control.

The only way to accomplish this is to detail a sufficient number of disciplined men (*i. e.*, soldiers) for this most important duty.

A brigade of the strength given would normally have 1934 mules (+ 52 cavalry ponies, not counted) ; adding 500 for commissariat, we get 2434—say 2500 mules.

If each infantry battalion were to detail a full company, with its officers complete, for baggage control, this would give one man to look after six or seven animals, and the state of chaos above described would be done away with forever.

These companies should be quite distinct from the baggage

guard: their duties are not militant (except when the baggage is attacked when of course every man must aid in repelling the enemy).

They should be instructed to strictly enforce the prescribed order of march, to prevent any straggling or jostling, and to see that the column moves at a steady even pace.

At present the baggage train is so extended that any portion of the guard is invisible to the greater number of the drivers, who, unarmed and timorous, feel their helplessness acutely, and this induces the state of panic described.

Under this scheme there would be several armed men in view of every driver which could not fail to give them confidence in their safety.

Moreover, in spite of all precautions hitherto taken, instances have occurred where daring parties of the enemy have made a dash at the baggage *en route* and looted a portion, killing the drivers. In these new conditions there would be sufficient guards at every point to repel any such attempt.

In leaving the subject of transport, there is one point to note—that is, that when gunny-bags become empty they should never be thrown away or left behind, as these, filled with earth or stones, form a most useful adjunct to the defenses of a camp.

VIII. CONVOYS.

Next to rear-guard actions, perhaps the most trying and difficult of operations in mountain warfare is the escort of convoys.

The force required for protection will vary in strength according as the convoy is moving on a line of communications with fortified posts at intervals, or in the heart of the enemy's country with no such *points d'appui*. The escort may either accompany the convoy for the whole march, or, if convenient, it may take half the road, the post of destination sending another escort half way.

The flanks of a convoy must be carefully protected by pickets which are disposed as described under "Marches." Hence at starting the advanced guard should be considerably stronger than the rear guard which will be continually reinforced by the flank pickets falling in.

A small party of cavalry should, if possible, accompany convoys for carrying messages, orders, etc.

Brigadier-General Egerton, in his excellent pamphlet—"Hill Warfare," gives the following distribution of an escort which may be taken as a model :

Advanced guard and flankers	2 companies
At 1st mile	1 company
At 2d "	2 companies
At 3d "	1 company
At 4th " rear guard	2 companies.

It being very essential that all convoys should arrive at their destination before dark, the strength of the train should be regulated accordingly and the length of march limited, according to the state of the road, to such as can be conveniently traversed during the hours of daylight.

In case of attack, the convoy should not halt, but press on : the task of defense will lie with the escort, and a halt, blocking up the road and causing unavoidable confusion, would not only hamper the defense, but be favorable to the enemy.

All straggling should be prevented, and the drivers warned to keep well closed up.

As all convoys will have a force of their own in front of them, attacks by large bodies of the enemy are not, as a rule, to be apprehended, but at every favorable point they are liable to sudden raids from daring small parties eager for loot. It will be the duty of the flanking pickets to guard against such attacks.

IX. FORAGING PARTIES.

A somewhat similar duty is the defense of foraging parties. These should never go far from camp, as they run the risk of being overtaken by nightfall before being able to return. A force should be sent on ahead to picket the road, and these pickets should be so disposed as to prevent the baggage animals from being fired on. An escort should accompany the animals, but during the retirement this alone will be insufficient for defense. A retreating foraging party is almost invariably attacked, and a force should be sent out from camp to cover their retreat. This body should take up the best available position to effect their object while the escort forms a strong rear-guard. The

flanking pickets must remain out where posted until the latest safe moment when they should join the rear-guard. As forage, etc., is most often to be found in valleys, cavalry will be useful, not only for scouting, but for checking the enemy's advance into the open.

X. THE DESTRUCTION OF VILLAGE DEFENSES.

When a detachment is sent out from camp for the destruction of villages, the advance should be conducted very much as described for "Reconnaissance." Once the village occupied, a cordon of pickets should be posted while the work of destruction is being carried out. The retirement will most likely be harassed by the enemy, a strong rear-guard therefore is necessary. If the fighting is very severe, it may be found necessary to send out a covering force from camp. Where the route lies through a valley, cavalry should accompany the detachment.

XI. EQUIPMENT.

There are a few points under this head which need attention. First, the fighting dress. The type of coat worn at present by British and Native infantry on field service has many faults. I think the fact has scarcely yet been recognized that the same dress will not do for peace and war.

In peace, before all things, the soldier should be smart; in war, he should be comfortable, and his dress should be suitable to the conditions of field service. The two cannot be amalgamated, and it therefore follows that there should be a special dress for war.

A new invention—"Millerained Khaki Drill"—has not, I think, received sufficient consideration for military clothing. It is perfectly water-proof, and at the same time is cool and sanitary wear. As regards its imperviousness to damp, I have subjected it to severe tests, including boiling water, and found it most satisfactory.

The field service coat might be made of this material. It should be of the "Norfolk shooting jacket" shape, very loose, with a turn-down collar that can be buttoned up in wet weather, and should be of sufficient length to allow of two capacious pockets below the belt, as well as two above; these pockets should have flaps; there should also be an inside pocket. On

the upper part of the shoulders and sleeves the material should be double, as a frequent duty on service is the carrying of fire-wood, materials for abattis, etc., from which these parts are liable to tears. With such a coat, any amount of warm clothing can be worn (underneath).

This is a great advantage, as in wet or very cold weather the great-coat might be dispensed with. If every man were provided with two thick fisherman's jerseys with long sleeves, to be worn over the flannel shirt, and a couple of pairs of warm long under-drawers (the trousers also being "Millerain"), he would be warm and dry in bad weather and at the same time always in fighting trim.

In mountain warfare fighting in a great-coat places the wearer at a great disadvantage.

In this way the weight of the kit might be reduced by—

	lbs.	oz.
Cloth trousers	2	3
Serge coat	2	0
Two flannel belts	0	12
Cardigan	1	12
	<hr/> 6	<hr/> 11

Also, if considered advisable, the great-coat might be left behind (a saving of six lbs.) and for night duties the soldier might wear both his jerseys under his coat. At present the great-coats alone of a battalion require 30 mules as transport. The omission of the articles above enumerated would mean a saving of another 34—total 64 mules per battalion.

The pouches issued to the infantry soldier are heavy and interfere with his marching.

Again if, in the excitement of an action, he forgets to buckle it, before he has gone far over broken ground it is empty.

The cross straps should be done away with, as they interfere with a man's movements, and two ammunition bags, shaped like the ordinary sporting cartridge-bag, should be carried, one over each shoulder, and prevented from swinging by the belt passing over the straps. Both bags and straps should be made of water-proof canvas. The mess tin should be attached to the

belt by a hook, and if the great-coat must be carried, it should be rolled over the left shoulder.

The trained scouts might be armed with a carbine instead of the long rifle. The lighter weapon is very accurate up to 1000 yards, and, provided with a sling, it could be carried on the back when climbing difficult places. The scout's duties are of observation principally, but when employed in fighting he would not be handicapped by his armament, as there are many experts who declare that the Lee-Metford carbine is a better weapon than the rifle.

The question of the officers' head-dress has been much discussed of late; I do not think the present helmet can be improved on. It throws a strong shadow on the face for one thing, which prevents a white face showing prominently in front of native troops. An officer is much more easily marked by his sword than his helmet.

The sword might be relegated to its proper place as a badge of rank in peace, and for weapons the officer might carry two revolvers.

The boots should be shod with brass, not iron. In a country like the frontier iron-shod boots are not only a source of danger from slipping, but also it has been found that, after constant wading in the streams through which the roads pass, the iron nails get rusty and fall out. By the use of brass nails and tips these inconveniences would be avoided.

The present ammunition boxes are difficult to open, and it is hard to get the ammunition out. An improved pattern is required.

Some of the greatest hardships to our troops during the late Tirah campaign were occasioned by the men having to sleep in the open without tents in cold and wet weather.

This should be avoided in future by means of *tentes d'abri*. If every man, in place of his great-coat, carried a sheet of Mil. lerained drill 8' \times 4' 6", made with eyelet-holes to lace together, a tent might be formed to accommodate two men which would be warm and dry. During one campaign beyond the frontier I carried (in a valise behind my saddle) a tent made of ordinary khaki drill which weighed only six lbs., in which I slept for many a night in snow and rain with perfect comfort.

As ropes for these shelters will be required and will be a vanishing quantity, each soldier might be provided with 30 feet of log-line and a small ball of English whip-cord when mobilized, and a stout jack-knife might be added to the equipment of non-commissioned officers.

XII. TRAINING OF TROOPS.

The first and main point to be attended to in the training of troops for frontier warfare is musketry instruction.*

To meet the frontier tribes on their own ground and in accordance with their methods of fighting, we require an army of skilled marksmen. Increased impetus should be given to competition in this most important of all military exercises. This might be done by increased rewards for good shooting, by a larger allowance of practice ammunition, and above all, by the institution of the light companies already referred to.

The first essential for the ideal soldier is to shoot well; the next, to march well: these, with perfect discipline and good conduct, make him a first-class fighting machine.

Let the course of musketry training be so modified as to lay greater stress on accuracy of individual fire, especially at disappearing targets. Special prizes might be authorized from regimental funds for inter-company competitions, which should include matches for rapid firing, which is at present rather wild and uncertain. Pool shooting, as a sport, should be encouraged, and every facility given the troops for using the ranger for recreation. At present muskety is too often looked upon as an irksome duty.

The next important point is marching, and in this we are now on the right road towards perfection. Orders have been lately issued for extended cold-weather marches for all troops in India whose manœuvres hitherto have been restricted to the environs of their cantonments. This is as it should be, and cannot fail to improve our marching powers.

In view of the great importance of the proper control and supervision of the baggage train in hill warfare, increased in-

* The improvement of shooting of course applies to artillery as well as infantry; but as regards this arm and also cavalry, the present system of training seems to be all that can be desired.

struction is required in the method of loading baggage animals. Instead of a few selected officers and men being trained in this branch, every officer and soldier in the army should be so trained.

This could easily be carried out at squadron and company training annually.

For this purpose, camels, mules, etc., with their pack saddles, might be lent to corps by the Commissariat or Transport Departments.

There are at present sufficient instructors in almost every regiment to efficiently conduct the training. What the men require is to be able to see at a glance if an animal's load is in its proper position, and if not, to be able to set it right.

As regards the training of scouts, something has already been said. This is a matter within the powers of every regimental commander, but to insure its efficient conduct, a General Order on the subject is needed.

The last point I shall mention (and it must be here observed that the whole subject is one which would require a special essay to itself, but that the limitations as to space of this competition prevent me from more than touching on it) is athletic training. The soldier in India is naturally inclined to a life of repose when not actually on duty: this is easily accounted for by climatic influences, but it should be the aim of all ranks to overcome this tendency, and athletic exercises of all sorts should be encouraged. Nothing useful can be hoped for in this direction unless the officers take the lead. At present polo is the officers' game, and in this the men cannot join. It should be the aim of commandants to encourage such games as cricket, football, hockey, wrestling, single-stick, gymnastic feats, etc. Prizes for gymnastics might advantageously be increased, and every advantage should be taken of hilly ground in the neighborhood to accustom men to move rapidly up and down hill and over broken ground.

These are the principal points requiring our careful attention in the training of our troops.

If the soldier can shoot and march and besides is obedient and well conducted, he only requires wings to make him perfect in his calling.

We have now concluded the consideration of the first part of this subject, *i. e.*—"War with the Frontier Tribes." There remains to be briefly viewed the second part, *viz.*,—"War with an Invading Army" under its two-fold aspect.

WAR WITH AN INVADING ARMY, THE FRONTIER TRIBES
BEING FRIENDLY.

If such a state of things ever takes place, our advantages over the enemy will be very great. With the tribes on our side, we could make, at the commencement of hostilities, an accurate survey of hitherto unknown regions, and thereby greatly increase our chances of success. Then the question of supplies would be greatly simplified: we should of course have to pay for them more than their market value, but in case of an invasion this would be a minor consideration. These tribesmen, moreover, being excellent fighting material, and possessing in a high degree the best qualities for guerrilla warfare, would be to us most valuable allies.

Officered from our army, they would hang on the flanks and rear of the enemy, and cause them incessant irritation and loss.

They would cut off their convoys, harass their camps, and in short, do them more injury than they have ever done to us.

The general tactical principles of such a war would be very similar to those already given, with such modifications as the enemy's methods of fighting might seem to indicate. For example, if they should favor close formations, we might make use of volley firing with advantage, and so on.

Then, again, we should not require all the harassing flanking precautions on the march above described, and instead of having to find our own roads, we should have reliable guides.

Levies of friendlies could, to a great extent, be utilized on our lines of communication, thereby releasing a large number of troops, who would otherwise have to be thus employed.

Under such conditions we should be in the most favorable position for carrying out the existing scheme of defense of our frontiers from foreign invasion.

We should not, however, be blind to the danger which lies in the untrustworthiness of these frontier tribes. It is very possible that at first they might pretend to be friendly, and their

first demand would assuredly be for arms and ammunition. If we provide them with these, we may possibly be putting into their hands weapons to be used against ourselves. It would be well therefore under such circumstances to arm them with rifles of an obsolete pattern, and strictly limit their supply of ammunition, which might afterwards be increased if their conduct were such as to inspire us with confidence in their loyalty.

There will always be three courses open to these tribes should India be threatened by invasion; to join us, to join the enemy, or to fight impartially against both sides, and it will, to a great extent, depend on our policy in the meantime towards them, which line they will elect. The fourth possibility, their neutrality, I think may be neglected.

The Pathan is, like the Irishman, always "Spoiling for a fight."

This brings us to the consideration of the second aspect of such a contest.

WAR WITH AN INVADING ARMY, THE FRONTIER TRIBES
BEING HOSTILE.

As before stated, this is properly more a question of strategy and policy than of tactics, for which reason I will limit my remarks to a few words.

In the event of India being threatened by invasion from the north-west, during the present reign, I think we might safely depend on the loyal co-operation of the Ameer of Afghanistan; the question is how far this would be useful.

The Ameer in the past have not had that control over their lawless and turbulent people which would give them the power to turn their fighting forces into any given direction at will.

The tribes are above all things clannish; they hold by their tribal heads, and these are not always inclined to accept the sovereignty of the Ameer.

The tribes then that we should find hostile under such circumstances would be those least under the Ameer's control, and least amenable to our influence—in fact, the very tribes that we have lately been at war with in 1897-98.

The policy therefore of taking up any forward position, the lines of communication of which lay through their districts, would be one exposed to great disadvantages. We should have

to fight a double foe—one enemy in front—another all around us. A strong division of all arms would be required to protect our convoys and communications; another of equal strength would be necessary to deal with any serious combination directed against our flanks, and thus a whole army corps would be occupied in minor operations apart from the main scheme of defense. To avoid this, it would be advisable to select a base of operations in another direction, keeping at the same time a close watch on the country north and northwest of Cashmere, in which we should have the loyal coöperation of that State. The Khyber should be strongly watched, and, if considered necessary, an advance made for a certain distance in this direction. A railway would form our line of communication with our base.

The whole country west of this line is now under our friendly influence and control, and the inhabitants are apparently of a peaceful disposition. The line itself would need to be strongly guarded at important strategical points to the eastward, as it is from this direction that attacks from the hostile tribes are to be apprehended.

Our tactics generally should be to work on interior lines; by rapid concentrations to oppose the enemy's advance at chosen points in superior force, aiming particularly at their flanks in order to cut off a portion from their line of retreat. Every use should be made of friendly levies who, from their intimate knowledge of the country, would afford us valuable assistance.

Our cavalry should be well pushed forward to supply us with early information of hostile movements. Mounted infantry signalling parties should accompany the independent cavalry division, and establish posts at convenient intervals, which posts must be adequately guarded.

Our artillery should be massed at important strategical points in the greatest possible force. We shall in all probability be greatly outnumbered in this arm, and care therefore should be taken against undue decentralization of our batteries.

In conclusion, our permanent fortifications and field works should not be looked upon as mere defensive posts, but rather as subsidiary bases from which effective counter-attacks may be delivered with the greatest advantage. *

BISMARCK'S APPRENTICESHIP.*

By WILLIAM M. SLOANE.

(From the Political Science Quarterly.)

THE number of published volumes concerned with Bismarck and his work increases steadily, but among them all there is very little trash. While many important sources of information have long since been made accessible in print, the *Gedanken*, which is the latest addition to the list, is quite the most important: Bismarck's thoughts and memories, committed to writing by himself—that is, dictated by him and set down by Lothar Bucher, who was easily the ablest of all his secretaries, and then corrected by the prince. The volumes tell us nothing new, but they authenticate what we have known and take us into the statesman's laboratory. It is a pity that our copyright laws forbid the sale of the German original in the United States except in a rather cheap reprint. The English translation displays many marks of haste and some inaccuracies; and it is confessedly a mosaic by several hands under one editor. Nevertheless, the two volumes are fine specimens of bookmaking, and in the main the editing is so good that the reader suffers little from obscurities of style. The text is for the most part thoroughly smooth, and the meaning of the author is quite clear. With these volumes in hand, supplemented by the posthumous book of Bucher, which is in the press, and with careful attention to what was already accessible—namely, the chronology, letters, speeches, interviews, conversations, official documents and memoirs of the day,—the substantive material

* *Gedanken und Erinnerungen von Otto, Fürst von Bismarck*. New York und Stuttgart, J. G. Cotta'sche Buchhandlung Nachfolger; New York, Lemcke & Buechner, 1898,—xxvi, 647 pp.

Bismarck the Man and the Statesman. Being the Reflections and Reminiscences of Otto, Prince von Bismarck. Written and Dictated by Himself after His Retirement from Office. Translated from the German under the Supervision of A. J. Butler, Late Fellow of Trinity College, Cambridge. With two Portraits and a Facsimile of Handwriting. New York and London, Harper & Brothers, 1899.—2 vols., xxi, 415; xx, 362 pp.

Le Prince de Bismarck. Par Charles Andler. Paris, Georges Bellais, 1899.—x, 400 pp.

for the annalist may be regarded as fairly complete. M. Andler gives, in one of the appendices to his excellent exposition of Bismarck's life and character, a list of about a hundred standard volumes—written, arranged or edited by Kohl, Poschinger, Boehm, Dove, Hahn, Busch, Jules Favre, Gerlach, Roon, Bernhardt, Penzler, Hesekiel, Sybel, Friedjung, Blum and Schweninger—which are in a sense original authorities. To these might be added Erich Marcks's *Kaiser Wilhelm I*, the lives of Bismarck by Charles Lowe and Edouard Simon, and that by Andler himself. This last is laborious, accurate, high-minded and readable. In it will be found only a few judgments such as none but a French critic could have written; the others are dispassionate.

Bismarck's public life may be divided into four periods: his apprenticeship down through 1866, his success in creating the German Empire, his career as an administrator in unifying Germany and his decline. It is with the first that the autobiography is really more concerned than with the others. To be sure, a third volume of thoughts and memories is in existence, though not yet published; but judging from the course of the narrative as far as printed, the value of the additional matter, if it ever appears, will not be great. Writing in advanced old age, with the bitterness of his forced retirement ever poignant, the veteran statesman naturally recalled his rise and victories with greater vividness than even his career as chancellor. His memories of his youth and prime are therefore set down with vigorous phrase; but as soon as he touches his later life, he seems weary and somewhat vague. It is not likely that his third volume could return to a stronger style; and its historical value probably lies in the text of documents connected with his dismissal.

At eighty Bismarck apparently felt a total indifference to the influences of his childhood and boyhood; for he dismisses them in his autobiography with a few words of rather colorless sarcasm about the ultra liberalism which he imbibed at school and college in Berlin and which he quickly unlearned both at the University of Göttingen and in his short experience as a bureaucrat at Aachen and Potsdam. He claims that he was from the first indifferent to his noble origin; for he signed himself plain

Bismarck, without the territorial prefix, until after the proposal made in 1848 to abolish the Prussian nobility, when he resumed the particle as a protest. The training of his father's house and the influence of his mother made him, in his own opinion, a true Liberal. This we take to mean that his sire was not as much of a younker or as self-assertive as most of the possessors of titles and sandy acres in the Old Mark of Brandenburg; that his burgher mother was so proud of her descent from a line of Liberal royal councillors that no younker of them all could awe her; and that this influence of the mother was stronger than that of her gentler husband. Moreover, although the great son was born in the Brandenburg manor house of Schoenhausen, which had been pillaged in 1806 by bands of Napoleonic soldiers from Soult's army and in 1813 had seen a battalion of Lützow's men encamped on its fields, yet the family was little concerned with hatred for the French or zeal for theories of national unity and personal liberty. Their income was in the main derived from fertile estates in Pomerania, on which they passed most of their time; their absorbing passion was tillage, drainage and the reclaiming of waste lands; and young Bismarck was more interested in farming as a business than in questions of social rank or political theory. His zeal for politics was purely practical, though as time passed he became a great reader and acquired a few germinal ideas of philosophical economics.

From 1837 to 1847 he lived the life of a Pomeranian squire—working hard, playing hard, reading hard, drinking hard; and it was as a representative of this class that he entered the provincial Saxon Diet and was chosen in the latter year a deputy delegate to the United Diet of Prussia, unwillingly summoned by the king to calm the popular tumults which were surging around him. Defying the law of 1815, which enacted measures for national representation, Frederick William III had constituted provincial diets to quiet the Prussian aspirations for self-government; but his successor was forced to express the national unity in some way, and he chose that of calling delegates from the provincial diets to meet in Berlin. Though under compulsion to this degree, the king was still grimly determined to conserve the absolutism which Prussia had in common with

Austria—a government by the crown assured and exercised by police administration; for he believed that he could not throw away a weapon still wielded by his rival and continue to cope with her. In his efforts to thwart anything approaching constitutional reform and representative government through and by the Diet, he embittered the nation at large and opened the vials of its wrath against him.

Bismarck's first important public appearance was in the meeting of the United Diet of Prussia, on May 17, 1847. His speech was an effort to prove that hatred of the French, and not a desire for parliamentary institutions, had led to the patriotic movement of 1813. The orator attracted no special attention from his fellow delegates; and his feelings must have been peculiar when, in the year following, rebellion broke out in consequence of the impossibility of securing popular rights by peaceful means. Although the barricades of the insurgent people in the streets of Berlin were not abandoned until the royal troops were withdrawn, yet, when the order to withdraw was given, the military were in the midst of a career which bade fair to be completely triumphant; and these conditions left room for both sides to claim the victory of fact as well as of principle. The desired constitution was promulgated—by the grace of a beneficent despot, as the Conservatives believed; in obedience to the popular will, as the Liberals always stoutly maintained. Bismarck's next important speech was a plea against granting amnesty to the rebels of 1848. This was in March of 1849; and in September of the same year he shouted, in an oration worthy of our most elevated stump fervor: "The Prussian eagle shall spread its wings from the eastern to the western boundaries of its domain, free and independent; not fettered by the influences of the Federation." The expansion of ideas is already evident. Further, he said with a sort of dramatic repression which now sounds like bathos: "This olive twig I plucked in Avignon as a peace-offering to the popular party; but I see the time has not yet come for that." It was at the close of 1849, in a confidential budget speech, that he made what has turned out to be his most famous utterance: "Not by orations and resolutions of a majority are the great questions of the time decided—that was the mistake of 1848-49—but by iron and blood." This was

the language which later gave him the title of the Iron Chancellor, but the phrase "iron and blood" was a quotation.

Thenceforward, though there were some modifications, there was little radical change in Bismarck's political creed. He believed that there were two methods of securing recognition for popular rights: from above, as he thought the Prussians must do; from below, as he said the English had been in a position to do in 1688—since, after a century of revolution and civil war, the nation had a crown to give away. "Prussian monarchs owe their position to God's grace and not to the gift of the people; it is a crown not hampered by any conditions, and they have voluntarily ceded to their people certain of their rights." His pivotal notions were: first, loyalty to the Hohenzollerns, with adherence to the law and to a constitution granted magnanimously by a victorious king (contrary to the general course of history) and sanctioned by the people; and, second, confidence in Prussia.

Divided as Germany was in 1848, the effects of the revolution consummated in France were enormous. Even the most reactionary German states had to yield somewhat, and the movement for unity gained in form and intensity. To this end liberal opinion decided that the effete Federation must be replaced by a modern system. A number of delegates to the various German legislatures assembled at Heidelberg and invited all who either were or had been members of diets, together with numerous other notable public men, to meet at Frankfurt. The invitation was accepted by five hundred. These in turn summoned a national assembly to be chosen by universal suffrage, one member for every fifty thousand voters. This body was elected in due form and sat with much solemnity, but it proved to be impotent, for its debates were wordy and doctrinaire. It soon divided into two opposing camps—on one side, republicans; on the other, constitutional monarchists. The rebellion of the German party in Schleswig-Holstein brought on a little war between Prussia and Denmark, and her untoward plight in domestic affairs compelled the former to treat for a prolonged armistice. This further embittered the disputes of the Frankfurt assembly, for in that body Prussia's conduct was entirely disapproved. Ultimately, however, it formulated a

cumbrous constitution, excluding Austria from organic connection with a proposed new empire but contemplating a special act of union with her. Austria meantime made a few concessions to her liberal subjects, but in a temporary reaction she subdued the rebellion in Hungary and firmly seated the conservative ministry of Schwarzenberg. She was therefore strong for the moment and vented her bitterness. The Frankfurt assembly, however, proceeded to offer the imperial crown to the King of Prussia.

In the discussions and contentions of the time, the constitutional monarchists were materially assisted by the high character of the ruling family of Prussia for wisdom, prudence and energy. Its very faults were due to over-anxiety, and its motto has ever been that the king is the first servant of the state. It has justly been remarked that, if the Stewarts had been the Hohenzollerns, the absolute English monarchy would almost certainly have stood firm until long after 1688. It was a favorite plea of Bismarck's that tried is better than untried virtue. As might be imagined, his third important public appearance was to denounce the Frankfurt constitution, with its suspensive veto, its indirect suffrage and its inadequate representation for Prussia. In consequence of 1848 the Prussian Liberals had secured for themselves a true constitution, imperfect as it was; for they had a real Parliament, with two houses and freedom of debate. Austria did nothing but grant to the people a share in the administration. The result was hopeless disunion, so far as Germany at large was concerned. The imperial crown was, however, refused by the King of Prussia. It was long believed that this refusal was due to the fact that Frederick William IV was personally an irreclaimable reactionary and would not submit to the proposal of the further limitation of his power by an imperial parliament. A close examination of his letter, however, indicates that, in the darkness of an imbecility which was slowly overcoming him, he had a glimmering consciousness of the fact—which is now clear—that Prussia was too weak to sustain the dignity. She would in all probability have been ruined in the effort. Another reason for Frederick William's course suggests itself in the fact—not sufficiently emphasized—that even so wise a man as Frederick William's brother, the Emperor

William I, hesitated to assume the imperial style in 1870 lest it might dim the glory of Prussia. Perhaps we may conclude that both brothers exemplified the same characteristic yielding, against inclination, to a stern sense of duty. The controlling motive of conduct, which Frederick the Great styled his "damned duty and obligation," took its special form in the Reformation and, having been embodied in Kant's philosophy and Schiller's verse, permeated the Prussians in every stratum of their social life.

In considering the rise of Bismarck, it is helpful to recall a comparison which he himself suggested. The two greatest statesmen of the nineteenth century were the younger Pitt and the German chancellor. Both were petty nobles, the former of the democratic, the latter of the feudal type. Both were aristocrats at heart and both were eager for conquest with the resultant enlargement of their sphere of influence. But Pitt was chiefly concerned for the extension of a system, while Bismarck showed an intense desire for power, as both a means and an end. The former was daring and always modern, the latter was prudent and often reactionary; the former strove to develop and be guided by popular power, the latter to repress and manipulate it. With Pitt it was always the crown for the sake of all Englishmen; with Bismarck it was, certainly at first, the crown for the sake of his class—a class, moreover, which was not continuous with Germany, but which was in the main Prussian or confined to certain Prussian provinces and thus even more particularistic. But just as Pitt was the exceptional commoner, so Bismarck was the exceptional youngster. Both were true statesmen and not mere politicians—men with prevision and prophetic insight, awake to the significance of past and passing events, and flexible where obstinacy meant ruin. With all his native arrogance, Bismarck understood the value of concession at the right time.

His fourth appearance as a parliamentary speaker was the defense of Manteuffel for the convention of Olmütz, where the Prussian minister yielded everything of importance to the demands of Schwarzenberg. For the sake of the peace which was essential to Prussia, in order that she might prepare for war, Russia and Austria were allowed to prevail also in their

defense of the Elector of Hesse, when he overthrew the constitution of his country. There was truth in the contention of Napoleon that Prussia naturally belonged to the liberal state system of Europe; and, had he lived fifty years later, he might have found her ripe for the alliance he proposed before he attacked her. In 1850 there was such a tide of liberalism that the momentary surrender of Prussia to the principal power of the Holy Alliance rendered the majority of the Prussian parliament furious. Bismarck's plea was very able and gave pause to many a liberal hotspur; he argued powerfully that Prussian honor consisted in keeping clear of all connection with revolution and anarchy. This clever evasion of the point at issue, for the sake of a higher expediency, was worthy of Frederick the Great, his prototype. It gave him the next step in his advancement.

In 1849 Bismarck's name had been suggested for a position in the ministry; but the king had struck it off the list, with the remark: "Only to be employed when the bayonet governs unrestricted." After the speech just mentioned, the psychological moment seemed to have arrived; and Frederick William, summoning with some anxiety the young country gentleman who had got himself talked about, cautiously approached the important question of the post of Prussian envoy at Frankfurt, where, after the futile attempt at "union" made by the congress which Prussia summoned to Erfurt, the Old Federal Diet had resumed its sessions. Without a moment's hesitation, Bismarck took what he chose to consider as a hint and accepted the mission. The king said: "You have plenty of courage in being so prompt to accept a position altogether new to you." The reply was ready: "It is your majesty that has the courage." Explaining that if the appointment did not turn out well he could be recalled, the young squire closed by declaring that, "if the master had the pluck to appoint, the servant had the pluck to obey." What appeared an overweening self-confidence was quickly justified.

Bismarck's single aim during his seven years' residence in Frankfurt was to thwart Austria. When he left Berlin, he felt that Prussian interests would be safe in Austrian hands, but he was quickly undeceived. Russia's object in the Crimean War

was to destroy Turkey. The question immediately arose as to whether Prussia should be Russian or side with France and England. The liberal sentiment of Prussia naturally inclined toward the western powers, and Austria's interest led her in the same direction. Although Bismarck knew English well, and had a certain leaning toward English modes of thought, yet, like many of his fellow-countrymen, he had never been able to forgive the desertion of Frederick the Great in his hour of need by George III. That act of perfidy was always in his thought and often recurred in his conversation. Whether it then influenced his mind or not, he took the ground that the first consideration for Prussia was the question of her hegemony in Germany and that, if she were to take sides at all, the burden of the war would fall upon her and she would be weakened, not strengthened, for the inevitable conflict with her rival. He pleaded, therefore, for a strong neutrality and a good understanding with Russia. In this policy he, of course, antagonized the public sentiment of his country; the liberals, in particular, were, as noted above, all for war and for an alliance with France and England. Bismarck's success in keeping Prussia aloof from the struggle naturally did not increase his popularity at home—at least as far as his attitude was known; for on the whole his work at Frankfurt was quietly done, and made no great stir until later, when its importance was recognized.

To all outward appearance the young diplomat was doing excellent routine work. He was likewise much occupied in amusing himself and travelled widely, in Italy, Hungary, Denmark, Sweden and Holland. During these journeys he collected an arsenal of information and experience, but without ostentation; and his true greatness was known only to the king and his brother, although many have since claimed to have discovered it at the time. How closely the monarch kept his envoy in touch, is shown by the latter's estimate that in a single year he travelled nine thousand five hundred miles in passing to and fro between Berlin and Frankfurt. Together the monarch and minister reached and enforced the conviction that any attempt at permanent union with Austria would be an effort to create an unequal match, and must therefore be futile. In 1859 Bismarck's work at Frankfurt was finished, and well

finished. He had found Austria the dictator of the diet; she had been converted into a respectable and cautious leader. Prince William succeeded his brother in 1858—first as regent, later as king. Like his brother, he knew Bismarck and felt that he had in him an invaluable minister, whose education must be finished by experience abroad; so Bismarck was recalled, to be appointed ambassador at St. Petersburg.

This mission first made the rising statesman a man of mark in European society. Not that he actually did much: there was little to do except to carry his head high and make himself respected. His *début* was interesting: invited to a bear-hunt with six others, he was permitted, as a matter of courtesy to a stranger, to kill the first bear driven in by the beaters; the gentleman hunter to whom the second brute had been assigned missed his mark, and the huge beast was promptly killed by the Prussian, to the relief of those whose lives might have been endangered by its fury; and by an unprecedented coincidence the same thing happened again! It can well be imagined that such a feat gave great renown in the gossip of the capital to the new ambassador. Not long after he was attacked by a serious illness and for a time lay at death's door; and his life is thought to have been saved by the wonderful self-control and skillful nursing of his devoted and capable wife. This double escape with life rendered him, of course, no less interesting than he had been, both in Berlin and St. Petersburg.

The best commentary on his short service at St. Petersburg is in the language which he used to a later Prussian ambassador, returning somewhat disappointed from the Russian capital: "Believe me, my dear general, that I have rendered greater services by what I have not said than by what I have said." It was probably by his own desire, and in furtherance of a plan formed in Frankfurt, that in the spring of 1862 he was transferred to Paris, where still further knowledge of European conditions was to be gleaned. There again, during the few months of his service, he shone rather by self-restraint than by activity. One day the Hessian *chargé d'affaires* desired his autograph for the same page in an album on which Guizot and Thiers had already written sentiments. Guizot had sentimentiously remarked: "All through my long career I have

learned to forgive much and often, but to forget nothing." Thiers had followed with: "A little shortness of memory cannot detract from the sincerity of forgiveness." Bismarck added: "As for myself, experience has taught me to forget many things and to get myself forgiven for many more." We may be sure that all the time the Prussian envoy was working hard, though quietly, for Prussian strength and ascendancy. Napoleon III considered him a man of no great force (*pas un homme sérieux*), but William I found no reason to change the opinion already formed—that he was a bold, single-minded, adroit manager of men.

The years of Bismarck's service as envoy at Frankfurt, St. Petersburg and Paris were a period of apparent reaction throughout Germany. The Prussian constitution was revised and retouched until the popular element was almost eliminated. After Olmütz federal troops occupied Hesse-Cassel, and the tyranny of George V in his kingdom of Hanover was upheld. In both Prussia and Austria the skillful manipulation of elections secured conservative diets, subservient to absolutism and ecclesiasticism, and the Berlin government engaged in a petty, stupid and disastrous quarrel with Switzerland about the Hohenzollern rights in Neuchâtel. The Italian war of 1859 displayed the hatred of France by Prussia, in that her troops were mobilized as a menace to Napoleon III on the upper Rhine. But this was the climax of reactionary and pro-Austrian policy. William of Prussia had installed a moderate ministry when he assumed the regency. Austria's disasters in the Italian war were largely due to the national apathy, and a new ministry at Vienna entered on the task of conciliating the people. Above all, the spectacle of a united Italy roused the Germans to a passion for a united Germany.

On January 2, 1861, the afflicted king of Prussia died and was succeeded by his able and amiable brother, as monarch in his own right. It was but a question of months when, free from the thrall of court intrigue and the influence of backstairs cabinets, he would call Bismarck to be his prime minister. The latter's correspondence during these years has revealed the growth of his ideas and the maturing of his policy. The details of this correspondence are wonderful: not an influential per-

sonage, man or woman, not a national characteristic of Baden, Württemberg, Luxemburg or any other state, great and small, escapes his caustic pen. Disposed at first to rely on Austria for support, he feared a war with France, whose imperialistic ambitions had presumably been renewed in the Second Empire. Whether Napoleon III attacked Austria or Russia, the greatest sufferer would be Prussia. An alliance with Austria would mean the relegation of Prussia to her old inferiority; an alliance with France was impossible. His whole effort while at Frankfurt was therefore to establish and keep an equilibrium, diminishing to the utmost Prussian distrust of France. His goal became the withdrawal of Austria from all influence in Germany; and to that end he inaugurated the policy of securing absolute neutrality from Russia and France alike, of preventing an alliance between them and, in the last resort, of making common cause with both, if necessary.

The result of the Crimean War was to create jealousy as to supremacy in the Mediterranean between England and France, to draw France and Russia closer, and therefore to make it probable that France, with the aid of Sardinia, would attack Austria in Italy. By means of the customs-union the internal peace of Prussia was secured; and when in 1857 Bismarck visited Paris to discuss the Neuchâtel affair, Napoleon III, disclaiming all desire for the Rhine frontier, actually suggested a Franco-Prussian agreement. The envoy listened attentively to the conditions proposed: to wit, that the Mediterranean should become a French lake or *à peu près*, and that France should secure a slight rectification of her frontiers here and there, while Prussia should take Hanover, Oldenburg, and at least a portion of Holstein. Bismarck returned with an assurance that Napoleon III would bring the necessary pressure to bear on Denmark—which was done—and that—as did not come to pass—he would likewise be present at the Prussian army manœuvres. But the ambassador did not propose the alliance to his government. Ostensibly he was recalled from Frankfurt because of his French sympathies! From St. Petersburg he solemnly warned against intervening in Italy on Austria's behalf; for Prussia would thereby strengthen her rival, and as against Austria she still suffered from an infirmity to be cured only "by fire and sword." His

words prevailed, and the programme for future action in regard to Prussia's rôle after William's coronation secured for him his removal to Paris, where he had the chance actually to observe what he had long since divined—the operation of popular representation as a safeguard against the encroachments of radical democracy.

Throughout his career as foreign ambassador Bismarck had been a popular man, both at home and abroad. He was not eminent in the first degree, but he was well known as a useful public servant, and he had considerable reputation as an agreeable and clever companion; he was cordial, frank, good natured and brilliant in repartee. Easily accessible, he made himself thoroughly familiar with every phase of Paris life under the Second Empire, and acquired a facility in the use of French which gave him most important advantages in 1870. Of Napoleon III he did not form a very favorable idea; he thought him a worthy man, but weak and easily led—above all, incapable of forgetting any service that had been rendered to him; and to Bismarck's mind this was an unpardonable feebleness in a public man. But Bismarck's popularity melted like ice before steam when he returned to Berlin and took his place as Prussian minister. The Conservatives were of course delighted, but the Liberals foreboded the worst and were dismayed. He was known to be an absolutist; and, being irremovable under the constitution, they could not, though in the majority, overthrow his power as long as King William stood by him.

For the situation that resulted in Bismarck's appointment the Liberals had only themselves to blame. The king honestly supported the liberal constitution of 1850; but the Liberal majority was doctrinaire, reckless and divided, being united on only one point—to wit, that they would not vote the supplies necessary to carry out the military policy essential to Prussia's strength. The lower house was utterly recalcitrant; and after two Liberal prime ministers in succession had failed to move them, the king resolved to abdicate. At this crisis Roon telegraphed to Paris "*Periculum in mora*," and Bismarck returned to show whether or not he had the abilities which the executive power believed that he had. He told the king that it was not a question of Liberal or Conservative, but of monarchical rule or

parliamentary government, and that the latter must be avoided even at the cost of a period of dictatorship. By such reasoning he dissuaded the king from his rash determination and began his work.

It was at this time that Bayard Taylor saw him. Bismarck in his forty-eighth year was an impressive figure, even in his stature, which was not then diminished by round shoulders or stoop, and was rather heightened, though without undue emphasis, by a somewhat exaggerated military bearing. His features were massive and in repose were as fine as if cut from granite, lighting but slowly when he spoke. A tremendous will was expressed in his large, clear, gray eyes, as well as in the outlines of his jaw. The new minister had need of all the firmness he could muster to carry out the deep-laid scheme he had formed at Frankfurt, for the consummation of which his training at St. Petersburg and at Paris had given him the necessary knowledge. From being merely a man of eminence he was soon regarded in his native land as a notorious character; he was, in the words of our countryman, "known, distrusted and—hated." The latter is Bismarck's own word. He was not even a favorite with his sovereign, who felt considerable distrust of his frank, headstrong, brusque, but indispensable servant. So far from being dismayed by the four years of gloomy isolation which he was compelled to spend at Berlin while preparing his first stroke, Bismarck boasted of his plight, writing that he was "the most vigorously and best hated personage in the country." It throws a bright light on the intrigues of court life, and on the methods of police government, to find him warning his wife:

"Do not forget when writing to me that your letters are not read by me alone, but by all kinds of post-office spies, and do not inveigh so hotly against individuals, for every word will immediately be carried back to the persons in question and put down to my account."

Bismarck's internal policy was one of stubborn and undismayed resistance to the Prussian Parliament. Year by year he struggled with the Liberal deputies for a budget which would enable him to strengthen the army, and year by year he was beaten in the game of parliamentary procedure.

The speakers of the majority pleaded for the liberty of their institutions; the minister pleaded for the integrity of the Prussian crown; and all the while the government went right on, spending borrowed money to perfect the Prussian army. There is something to be said for its course: the times were unripe for full parliamentary government; elections were more nominal than real; the quality of legislation was low; not more than a third of those who possessed the suffrage exercised the right, and it was thought that of the non-voters as high as seventy-five per cent. were Conservatives. For Bismarck's purposes, there was everything to gain and nothing to lose in the course which he adopted. As early as 1849 he had enunciated the policy to be pursued by the Prussian crown with reference to the Prussian Parliament. When, with regard to the danger of suddenly introducing free institutions among those who did not know how to use them, it was urged that no one could learn to swim without going into the water, "True," was Bismarck's retort, "but why plunge at once into the deepest part?" During four entire years, after 1861, the government was compelled to get on as best it could without a budget; and it was not until after the Danish and Austrian wars that, in 1866, its policy secured parliamentary endorsement in the shape of a vote, 250 to 75, granting indemnity for all that had been spent, up to that date, over and above the budget of 1861. By that time Bismarck's popularity in Berlin was fully established. One of the minister's consolations during this dark epoch was his friendly correspondence with Motley; for their acquaintance, begun long before at the university, had ripened into a friendship which remained firm to the end.

Bismarck's external policy during these "years of conflict" was quite as clever and bold as that which he used in the management of internal affairs. Indeed, the two were parts of a single whole. The Prussian Liberals believed that the increase of the military power was aimed at their own liberties, and so did all Europe. The same fearlessness with which Bismarck deceived his own countrymen was used by him in deceiving both France and Austria, and with them the other powers. It was daring and brilliant—daring, because the slightest misstep would have involved him in ruin; brilliant,

because he had nothing to do except to keep silence and leave his rival ministers to discover at their leisure how entirely a new type of diplomacy had superseded the old, and that to their complete disaster. When in 1859, after Solferino, Napoleon III received Venice from Austria, he urged on the Czar Alexander that, as there could no longer be any question of the restoration of Poland, as many concessions as possible should be granted to that unfortunate country. This was in accordance with the policy of the Napoleonic house, and was intended to conciliate the liberal imperialists of France, who felt that such reparation as was possible should be made to a land which had risked and lost everything in its support of the first Napoleon. Russia earnestly desired the French alliance for two reasons: first, that she might render null the agreement which prevented her war vessels from cruising in the Black Sea; and, second, that she might further her plans for the dismemberment of Turkey, by an understanding with Napoleon III concerning a compensation to him for her aggrandizement—a counterbalance in the shape of an increase of territory for France on one or the other bank of the Rhine. The Polish Conservatives desired autonomy for Poland under Russian protection, in order to win the Slavonic populations of Austria. To check these anti-German influences, Austria desired to strengthen herself where she had once been influential—that is, among the small German states. For this purpose she chose the Schleswig-Holstein question, which, owing to the measures taken by the king of Denmark, Christian IX, to spread the Danish tongue and Danish feeling among the German populations of those lands, was now entering on an acute stage. Austria proposed that the matter should be presented for settlement to the Federal Diet, in which she was strong, calculating that with success would come a great addition to her prestige.

Meantime, the Polish Radicals—or “Reds,” as they were called—had again broken out in rebellion. Napoleon III was of course displeased; but England, suspecting the intrigue of France and Russia, was in sympathy with the rebels. It was Bismarck's belief, whether based on information or not, that Napoleon was to get Belgium and the left bank of the Rhine in return for Russia's gains in the East, whatever they might

be. He was satisfied that Napoleon, Gortschakoff and Wielopolski, the governor of Poland, had an understanding to that effect, and that in coöperation they would attack Vienna and Constantinople simultaneously. With characteristic promptness he sent Alvensleben to St. Petersburg for explanations, determined at any cost to use the insurrection for the destruction of the Franco-Russian alliance. The pretext of Alvensleben's mission was a consultation as to the best means of suppressing the insurrection, on the ground that its success would deprive Prussia of her Polish provinces. The Czar gave heed to Bismarck's representations and, discarding Gortschakoff's councils altogether, joined Bismarck in a defiance of the most enlightened public opinion of Europe.

A convention was at once signed, which bound Russia and Prussia to joint efforts in suppressing the insurrectionary movement in their respective Polish provinces. England was displeased, for Russia's success might reopen the Eastern Question in a form complicated by Prussian influence; France was displeased, for Prussia's success would mean an increase of prestige likely to thwart her own ambitions for territorial aggrandizement on the left bank of the Rhine and in Belgium. Moreover, the Clericals and Radicals of France were alike enthusiastic about Polish liberty in the abstract. Accordingly, Napoleon tried to unite Austria and England in a protest. In this effort he had the powerful assistance of Gortschakoff, but Austria followed the lead of Lord John Russell and refused. This was a momentary check of Pan-Slavism and redounded vastly to Bismarck's credit. Throughout his life Bismarck had a definite and unvarying policy with regard to Russia: it was to remove her influence from Germany, but to refrain from harming her in any way, and thus to keep her good will. In his opinion, war with Russia would be worse than useless: the Baltic provinces could have no value without Poland; and to take Poland would add nine million Roman Catholics to the Prussian population, and thus increase the proportion in all Germany to nearly fifty per cent. This was the fixed idea which made him so firm an advocate of the Russian alliance.

When Frederick VII of Denmark died, he was succeeded by Christian IX of the Glücksburg line, inheriting by female

descent. The duchies were under Salic law, and in them the succession lay in the male or Augustenburg line. Nevertheless, the new king of Denmark approved the plan of his Diet to incorporate Schleswig into Denmark and to make Holstein tributary to her. This was generally considered a breach even of the London protocol of 1852, signed by Prussia and Austria but not accepted by either the duchies or the Federation. It guaranteed an independent administration to Schleswig and left Holstein in substantive relations with the German Federation. The populations of both lands were largely German, and the Germans protested against the Danish policy. Austria had made her last attempt to combine Germany under the dual leadership of herself and Prussia in the so-called Congress of Princes held at Frankfurt in 1863. The effort failed because Bismarck prevailed on his sovereign not to attend, and the minor states would not consent to act without Prussia.

But the first stage in the process, which made Austria Prussia's ally in 1870, was reached in connection with the question of the duchies. The Federation determined on joint action and sent an army of Saxons and Hanoverians to occupy Holstein. This was done without bloodshed; but the Council of the Federal Diet would not yield to the demand of Austria and Prussia for a similar occupation of Schleswig. Thereupon Bismarck determined to make a preliminary trial of the now well-organized Prussian army. Lord Palmerston was furious when informed of the fact, but he could not well defend Denmark in a flagrant breach of public law. The minor German states and the Prussian Liberals were equally outraged, and Bismarck was denounced far and wide in unmeasured terms. The Prussian Parliament refused either a budget or a loan. King William and his minister both pleaded that the undivided German states of Schleswig and Holstein must never be sundered, and Bismarck declared that he would find means to prevent it, wherever they could be found. War was declared on the basis of the budget of 1861 and the result is well known. The Peace of Vienna secured the duchies to Prussia and Austria jointly. And when Austria proposed that both should go to Prussia, in return for Silesia,—a proposition hateful to King William,—a compromise was reached in the Convention of Gastein, which gave the

administration of Schleswig to Prussia and that of Holstein to Austria.

The easy success of the Danish war was the crown of Bismarck's first great diplomatic enterprise. Although his plan seems simple enough now, it was a masterpiece: England silenced by an appeal to treaty obligations, Russia won by his Polish policy, France appeased by his coquettish attitude and the favorable commercial treaty with her which was among the first successes of his ministry, Austria flattered by a joint enterprise in the consolidation of Germany. As to Prussia, the Liberals had to rub their eyes before they could realize what had happened: the army had acquitted itself like veterans, their country was at length the equal of its hated rival in the councils of Germany—and with such a pilot at the helm what port might not be reached? Bismarck was a despot, but he had at least done his country no harm. Still, however, the Liberals refused him their confidence. This had to be won, and the minister was not long about it. The opportunity was soon afforded by Austria, which on June 1, 1866, proposed the final settlement of the long-vexed Schleswig-Holstein question by the Federal Diet. Bismarck at once declared the Gastein Convention to be abrogated and, asserting that the joint occupation of both powers was accordingly restored, sent Prussian troops into Holstein. Austria carried the Diet for the mobilization of its armies against Prussia, and Bismarck proposed the peaceful exclusion of Austria from Germany. Prussia was now strong enough to accept the leadership which had been offered in 1849. The proposition was repelled and the Prussian Liberals still refused him their confidence. Nothing remained but to exclude Austria from Germany by force or to begin the process of retreat, the last thing of which the minister dreamed.

The same condition of diplomatic equilibrium continued in Europe, and this new trouble was, moreover, a German family quarrel. But to make assurance doubly sure, Bismarck knitted another mesh into his web. Italy was easily won to attack Austria on the south, by the prospect of regaining her unredeemed provinces from the rule of the invader. Accordingly, when war was declared in 1866, Prussia, though confronted not merely by the Austrian army but also by the forces of

Hanover and all South Germany—including Bavaria, Saxony, Würtemberg, Baden and Hesse—had a powerful and enthusiastic ally on the rear of Austria, the most redoubtable foe. With almost incredible swiftness the Prussian army swooped down on its enemy, the inherent weakness of which was well known at Berlin in the office of the general staff. Austria received telling blows and perforce surrendered her Italian provinces into the hands of Napoleon III. Her humiliation was completed, after a short campaign of six weeks, by the well-known battle of Sadowa. Where were the armies of South Germany? Marching separately, according to the first great rule of strategy, but not following the second great rule of striking together. Indeed, they were guiltless of striking at all, so far as effectiveness went. The mediation of France was offered on the morrow of Sadowa and was not refused by Prussia; but the Prussian army did not halt in its pursuit until the walls of Vienna were within sight, and then first Bismarck made ready to treat. The preliminaries were to be concluded at the castle of Nikolsburg.

Bismarck, the despot of Prussia, was now Bismarck, the liberator of Germany; but he had difficulty in securing his own way in these important negotiations, and that, not because of his foes, but because of the dangerous recklessness and short-sightedness of the military party, which threatened to do Prussia as much harm in 1866 as its predecessor had done in 1805. Roon and Moltke, supported by the king, wished to continue the war without awaiting the result of negotiations; they had also in mind the annexation of Austrian territory. Bismarck was opposed to both ideas. The military party believed that by marching westward they could conquer the South Germans and at once engage France advantageously, since she was at that moment embarrassed with her ill-starred expedition to Mexico. After Sadowa, Napoleon III had first presented an ultimatum, demanding the left bank of the Rhine with Mentz, and had then withdrawn it, in view of the very situation which William and his military advisers wished to turn to Prussia's advantage. Doubtless their plan would have succeeded; but the union of Germany accomplished thereby would have had a purely despotic character, and even less organic quality than that which was eventually infused into it.

Influenced by the memories and traditions of the Napoleonic wars, all Prussia had regarded the rise of the Second Empire in France as a menace to its national development. Napoleon's conduct intensified this feeling. After Sadowa he warned both the Austrian emperor and the Bavarian prime minister, and himself began preparations for the war which he, like Bismarck, foresaw was inevitable. The latter was determined that, when the war did come, there should be a Germany as united as possible, and that it should have the vital quality of being a patriotic uprising of Germans—without distinction of abode or religion—to wipe out the memories of their humiliation at the hands of the first Napoleon. To this end he took his stand at Nikolsburg on the following fundamental points: Prussia was not prepared for war with France, and there was cholera in her armies; the South German troops were not yet defeated, and with foreign assistance they might be formidable; to continue the war it would have to be carried into Hungary, since Austria would not yield any territory without further fighting; the end would be the destruction of Austria and the triumph of Pan-Slavism. This last catastrophe would be fatal to all Prussia's aspirations, and on that position Bismarck planted himself.

We are reminded of the Homeric heroes by what followed. Bismarck had shown himself a man after his king's own heart on the battle-field of Sadowa: he was thirteen hours in the saddle; and since at nightfall all the houses of Horschitz were filled with wounded, he threw himself down for rest on the pavement, while the king slept on a shake-down in a chamber near by and in his uniform; but when the determined and plucky minister found that he could get no hearing for a plea of magnanimity at Nikolsburg, his nerves gave out, he walked into his bed-chamber and was "overcome by a violent paroxysm of tears." Next day, with a memorandum of reasons for peace in his pocket, he returned to the attack. The cholera had rendered half the Prussian army unfit for service; and with this as an additional reason for persistence, he won the heart and convinced the reason of Frederick, the crown prince, through whose influence he finally prevailed. The king consented, in his own homely phrase, "to bite the sour apple." The terms offered to Austria were that she should withdraw from the German Diet,

but she was to lose no territory. Both Schleswig and Holstein were to go to Prussia; the Italian provinces ceded to Napoleon were to be given to Italy. These comparatively easy terms were promptly accepted, and soon after were embodied in the peace of Prague. By this paper Hanover, Hesse-Cassel, the duchy of Nassau and that portion of Hesse-Darmstadt north of the Main were incorporated into Prussia. As a further concession to Austria, Saxony was left independent; as also were Bavaria, Würtemberg, Baden and Hesse. By all these powers a defensive alliance was guaranteed to Prussia. The North German Confederation was likewise inaugurated, and on almost precisely the liberal democratic lines sketched by Bismarck in his St. Petersburg papers.

When Bismarck returned to Berlin, he found himself the most popular man in Prussia. The old-fashioned Prussian liberalism, of whose representatives—the lank, grim, snuffy ideologists—Heine made such unmerciful sport, were transmuted as if by a wizard's wand into an enthusiastic party of National Liberals. They were at Bismarck's service: the budget was passed, indemnity was voted, and the trusted minister was made a count by the king amid universal acclamation. All eyes were fixed upon him as he began his work of legislation for the strong new Confederation, which was to replace the feeble and antiquated Federation whose Diet had sat at Frankfurt.

When young Blind in an access of crazy fanaticism attempted to assassinate Bismarck, the minister displayed such heroic calmness under the severe wounds which he received that already mythical tales were told about him. And when the first sketch of the new constitution was given out, it was found that the Prussian youngster had been transformed into a German Liberal—almost into a Democrat! Wonder and delight knew no bounds among those who had been his most determined enemies. The concessions of the instrument, which is epochal in German history, were indeed amazing: there was no house of lords, not even a single executive; and legislation was entirely popularized. The executive was the King of Prussia, with a Federal Council whose chairman was chancellor. The members of the Council were appointed by the various states. The legislature was the Council and a Diet elected by manhood

suffrage. To the union were intrusted military and naval affairs, commerce, railways, telegraphs and the post-office, criminal, civil and commercial law, with the organization of the judiciary. These measures seemed to have been forced upon the lawgiver by the menacing attitude of France. In 1867 Bismarck felt himself strong enough to thwart Napoleon III in the Luxemburg affair, by revealing the alliance of the Confederation with the South German states; during the three following years he devoted himself to strengthening the Confederation in every possible way. His energy and prudence partly awed, partly won all the federated states to accept the Bismarckian and Prussian policy. His best work as a diplomat was shown in the skill by which he dallied with Napoleon's offer of an offensive and defensive alliance on the basis of giving Belgium to France, while at the same time he was steadily turning the customs-union, with Bavaria and the other German states, into a strong political unity. His sole contention in this last difficult task was that Bavaria should not be allowed to reap all the benefits without sharing the responsibilities. This was a course based on the advance of public opinion. Bismarck had ceased to be a Prussian and had become a German; like Lincoln, he could now both trust the soundness of public opinion and afford to wait for its evolution.

In all this Bismarck appears to the world beyond Germany as the enigma of enigmas. But the solution is not so difficult after all: the answer is identical with that to the riddle of *Œdipus*. He was a man; but a historic man, embodying in himself an epoch and a race, not a cosmopolitan. His fore-runner and secular cause was Napoleon Bonaparte, who first sowed the seeds of modern French philosophy broadcast throughout western Germany, and then caused them to germinate in the feeling for nationality which ruined his own imperial designs and continued its evolution on the lines of German philosophy. For nearly a century the agitation ran its course; Bismarck formulated its achievements and realized its ideals. He did so because in his own person and character he embodied the strength of Germany. The reader will find his book ponderous and far from clear in the exposure of motives; but it is a perfect picture of the man. It is permeated with the German

concept of discipline, which is not at all the unreasoning obedience to commands it is so generally considered to be. Such obedience he neither exacted nor gave: on the contrary, he struggled with might and main against his sovereign throughout all these years, and he reasoned and pleaded with his subordinates. But when the categorical imperative was settled, there was no paltering. He believed himself monarchical to the core, but by his own confession he was saturated with conceptions of concrete, defensible rights and of class privilege; he passionately supported monarchy only because in this institution he saw the guaranties of the others in a structural society with no fluidity, a political and social organism evolved by long historical processes, sanctified by religion, exhibiting the providential care exercised to create and support Prussia under the Hohenzollerns.

Even Bismarck's religion, indeed, is national. A sincere orthodox believer, he wrapped himself in mysticism. God is preëminently a force: in his dealings with men he is all action. The moral order of things foresees, provides, concludes. Just as royalty is justified only by its deeds, so it is with God in relation to man. As microcosms, both state and individual must within finite bounds foresee all things, arrange all things; and the resultant compulsion represents duty done. Just as the divine will comes from above, so the royal will ordains internal affairs and foreign relations, arranges peace, declares war. Chambers sit to discuss and modify, but in the end to approve: nothing originates with them. Likewise in the Church: inalterable essentials aside, organization, movement, impulse come from the king, who is the lord of his subjects in all spiritual as well as in secular relations—the lord of that organized force which maintains peace and orders war, which upholds both the divine power and the spiritual nature of man in outward, visible institutions of which the Church is one. Christians are faithful as they observe its ordinances and exemplify faith by deeds.

These elements of faith and conduct are abundantly present in the successive steps which lead up to the Franco-Prussian War of 1870, and in the reforms which subsequently turned the North German Confederation into the German Empire. Tyros have seen in Bismarck's belief and behavior during both these

periods evidences of arrested development in his nature, intellectual and spiritual, accompanied by a sort of religious hypertrophy which deified force. This is an utter perversion of truth. The great statesman illustrates to the end the interaction of what Kant called the pure and critical upon the practical reason, personal and national. This idea working in other conditions may be the topic of a later discussion; the object of this paper has been to exhibit its strength during the formative and greatest years of a life working under the conditions just outlined.

NAVAL AND MILITARY PROGRESS IN THE UNITED STATES.

By C. S. CLARK.

(From the *United Service Magazine*. London.)

FEW readers of service periodicals are unaware that the United States has "experienced a change of heart" and is making up for lost time by rapidly increasing its armament. But there are, perhaps, not many, except those in Intelligence bureaus, who have taken the trouble to collate the facts regarding the great advance made by the United States during the past two years.

At a time when a vast majority of Americans are strongly in favor of the Anglo-American alliance, and if the newspaper reports are to be believed, the sentiment of Great Britain favors such alliance, it may be of interest to many to learn what the United States is doing since the war to earn the appellation "a strong ally."

Army.—The Regular army was, in 1897, composed of 26,000 officers and men. It now consists of 65,000, and the President has the power to increase it to 100,000 by the addition of 35,000 volunteers. The National Guard, returned to State service, is no longer an untried body of citizen soldiery, fond of full dress uniforms and ceremonies, but a very sober, business-like army of 125,000 men with "all the nonsense knocked out of them" by service of from six months to a year under canvas, controlled

by Regular officers. In nearly all the States the Guard will be re-organized and re-uniformed, and State encampments are to be succeeded by the roughest kind of field service and manœuvres.

Behind the Guard is now a body of 150,000 former United States Volunteers (many thousands still in service), who have had long and severe training, and will, during the next few years, be an efficient Reserve.

Sinews of War.—The appropriations previous to the war for military purposes were: for the army, \$23,278,000; for the militia, \$400,000; and the States appropriated about \$1,500,000 for their State troops. It is the custom in the United States, when an appropriation is insufficient, to provide the amount needed in "the Deficiency Bill." This provided for deficiencies of only \$8,594,000 in 1898, but for deficiencies of \$347,165,000 in 1899. The tremendous difference is amply provided for by the War Revenue Tax of 1898, which has been estimated at \$1,000,000 for each business day, or \$300,000,000 a year. Other expenditures being provided for from other sources, this sum, paid annually, may be regarded as a special "War Fund," which will provide for extraordinary expenditures in the future.

Ability to Produce War Material.—The demand for guns, armor, and material of war has induced manufacturers to establish plants, enabling them to turn out almost everything desired in large quantities. Two private plants are turning out smokeless powder, several are making armor-piercing projectiles, and several others are making rapid-fire guns and the brass cartridge-cases formerly bought abroad. A few years ago six-inch gun-jackets were bought abroad. Sixteen-inch guns are now being made at home. The Naval Gun Factory at Washington is being doubled in size, and both this and the army gun factories supply guns faster than they can be mounted. A large reserve supply of the Krag-Jorgensen is accumulating, the Springfield rifles are to be altered to use smokeless powder, and the Remingtons are prepared to supply a new 30-calibre Remington, also using smokeless powder. Gatlings, and dynamite guns of large calibre are to be supplied to the army, and successful experiments at Sandy Hook show that high explosive shells can now be used in ordinary cannon.

Staff Training.—Having to deal with and provide for small forces at home, the Staff Departments of the army were notoriously unable to cope with difficulties at the opening of the war. A large increase of the working force, vast experience, and long training have now transformed these departments into highly efficient bodies, dealing rapidly and very sensibly with every problem presented. As an instance of the changes, it may be said that the Quartermaster's Department, formerly supplying 25,000 men at home, now supplies 100,000, half of them abroad, and manages a fleet of thirty-nine ocean steamships. The Commissary's Department feeds an army 10,000 miles away in the Philippines, and another a thousand miles away in the West Indies, and the men write home that "this is the only war they ever heard of during which the men sat down to three regular meals a day." The United States had no more pressing need than an efficient staff. It now has it.

Fortifications.—In 1897 the country had not a single modern sea-coast fortification, and it was admitted that a fleet of foreign warships could destroy, or lay under contribution, any coast city. The appropriation for fortifications available in that year was that of 1896: \$1,900,000. Since that time over \$26,000,000 has been appropriated, beside \$11,600,000 from the Defense Fund: a total of \$37,600,000 for forts, mounts, and ammunition. The result is seen in a nearly completed chain of coast fortifications, in which are 8-inch, 10-inch, and 12-inch guns mounted on disappearing carriages, mortar batteries in groups, and mine fields covered by rapid-fire guns. Search-lights, telegraph cables, and all the paraphernalia of a highly developed system of defense have been provided. In the principal harbors 16-inch guns are to be placed on shoals near channels, in conical Gruson turrets. It is not likely that any fleet would now be able to enter New York harbor, as it would be under constant and deadly fire for twenty-five miles.

Coast-Guard.—No coast-guard existed before the war. During the war the Life Saving Service, which has 192 stations on the Atlantic coast and 15 on the Pacific, was organized with the Naval Militia as a Coast Signal Service. This service, which was well equipped, will be further improved and elaborated, and in any future foreign war render efficient aid. The "mis-

sion" of the Naval Militia of the States will be to take charge of this service and patrol the coast in a fleet of swift scouts—the 28 yachts and 27 ocean tugs, purchased and retained in service, and the 51 torpedo boats and destroyers. Three lines of defense will thus be provided: the patrol fleet mentioned, Coast Signal Service, and inner and outer lines of fortifications—none of them in existence previous to the war.

Naval and Coaling Stations Abroad.—The United States had no naval or coaling stations in the West Indies, East Indies, or Pacific. It has now Navy Yards which are being furnished with complete repairing plants at Cavité, Manila Bay, and at Havana. Large Naval Hospitals are to be built at these Stations. It has also coaling stations at Guam, Honolulu, and San Juan, all now in United States territory. Each coaling station is to be fortified and provided with a permanent garrison and guard-ship.

Docking Facilities.—These were lacking to a humiliating degree. The large dock at Brooklyn was not completed, those at Port Royal, Norfolk, and Scaith, reached only through shallow and tortuous channels. The Brooklyn dock is now completed, and Congress provided in 1897, for large dry docks at Portsmouth, Boston, Philadelphia, New Orleans, and San Francisco. The coppering and sheathing of warships, provided for by the Act of 1899, will render vessels capable of keeping the sea without docking for long periods.

INCREASE OF THE NAVY.

(a) By Building.

Five first-class battle-ships with a tonnage of 53,050 and 235 guns are nearly ready. Three 12,500-ton battle-ships, and four 2700-ton Coast Defenders have been commenced. Three 13,500-ton battle-ships, the *New Jersey*, *Pennsylvania* and *Georgia*, three 12,000-ton armored cruisers, and six protected cruisers will be taken in hand during the year. When all these are in process of construction, 135,000 tons of battle-ships costing \$60,000,000 will be in hand. There are now being constructed 53 vessels, including torpedo-boats, and twelve more are authorized. Four old cruisers have been entirely rebuilt, and one new cruiser (*Chesapeake*) is being completed at home and one

(*Albany*) in England. Twenty torpedo-boats are ready and thirty-one are building.

(*b*) By Purchase.

Eleven cruisers were purchased in 1898, seven being American merchant vessels, and two torpedo boats. All are in service. Twenty-eight steel steam yachts were purchased, have been converted into gunboats and have been retained for use as gunboats in shallow waters, for which with their high speed and draft of only a few feet, they are well fitted. A large number of ocean tugs of large dimensions have also been retained in service.

(*c*) By Capture.

The cruisers *Isla de Luzon*, *Isla de Cuba*, *Reina Mercedes* and *Don Juan de Austria* will be repaired and refitted at once at the Cavité and Norfolk Navy yards. The *Glacier*, refrigerator ship, is carrying to Manila American fittings, machinery and guns for the two first named. The *Callao*, *Alvarado*, *Sandoval*, and *Baracoa*, gunboats, are already in commission. The *Leyte*, *Manila*, and *Mindanao* will be commissioned, and it is very likely that many of the fifteen gunboats captured in Cuban waters will be made serviceable.

Troop-Ships.—A transport service with a capacity of 27,000 men has been organized as a branch of the Quartermaster's Department of the army. Thirty-six ocean liners have been purchased, refitted in the most complete manner, and named after famous generals of the army. Two regular lines have been established: between New York and Cuba and Porto Rico, and between San Francisco, and Honolulu and Manila. Fine terminal facilities have been provided at the home ports. Instead of having no transport service whatever, the United States is now better provided with troop ships, used for no other purpose, than any nation except England.

Hospital, Distilling and Refrigerating Ships.—These were unknown in the United States Naval Service before 1898. The army has now three hospital ships in commission, the *Missouri*, *Relief* and *Aid* fitted out in a manner enthusiastically described by the medical profession as "superb." The navy has at Manila, the *Solace*. The "distillers" to provide fresh water are the *Iris*, *Regulus*, and *Niagara*, the "refrigerators"

with cold storage for meat and vegetables, the *Supply*, *Culgoa* and *Glacier*, also used as supply-ships.

Colliers and Repair Ships.—Nineteen colliers were purchased in 1898, and at least one is now attached to each fleet, others being employed on special service. Four machinery repair ships have been provided, the *Vulcan*, like the English *Vulcan*, being the best of them. Not a collier or repair ship was owned by the Government before the war.

Auxiliary Services.—During the war the country suddenly realized that in the Revenue Marine Service, Lighthouse Service, Fish Commission Service, and Coast Survey Service it had a junior navy of respectable dimensions. The fine steel vessels of these services, in many cases larger than naval gunboats, were at once added to the navy with their efficient officers and crews. In any future war the same course will be pursued. More than forty modern steel gunboats may be procured from this source. There are about 1100 officers and men in the "Revenue Cutter" Service, and 1200 in the Lighthouse Service.

Training Squadron.—This has been largely augmented since the war in view of the increased demand for trained seamen, gunners and machinists. Modern vessels have now been added to the training fleet and over thirty vessels will be employed in the service.

Reform in the Navy.—The number of enlisted men and apprentices has been raised from 9000 in 1896 to 20,000, to which may be added in war 5000 naval militia and 2500 from auxiliary services. The Reorganization Bill of 1899 has placed line and engineer officers on the same footing, has removed jealousies, and provided for giving "command rank" at an early age.

These are a few of the changes which a year or at most two years have brought, and they are certainly changes worthy of remark.

THE PRACTICAL TREATMENT OF TYPHOID
FEVER.*

BY BASIL M. TAYLOR, M.D., GREENSBURG, KY.

(From the Medical Record.)

YOU will pardon me if I ask your indulgence for presenting a paper on a subject that has been written threadbare in every medical society. Few, indeed, are the programmes that have no paper upon this disease. Though discussed by us all, still we have only approached the land, anchored in a small inlet, and picked up a few pebbles along the beach of knowledge of typhoid fever. This is a disease that we all meet, and it claims its victims of all ages, from the cradle to old age, the weak and the strong, the rich and the poor. I will not burden you with text-book theories or temperature charts—these you can get at your leisure—but will give you facts as they have come from original research. Neither will I discuss pathology—it is the patient and not the disease that demands our attention.

As typhoid fever is a self-limited disease, we cannot abort or even cure. Those cases that are aborted are not typhoid fever. We are only nature's assistant, or else we are *particeps criminis*. In our treatment of diseases we occupy one of two places—we either aid the patient or the disease. There is no neutral ground unless it is outside the patient's house. Gentlemen, when you weigh this statement carefully you will find it the truth. Every dose of medicine requires some antagonism. When the body is at war with disease, struggling for the survival of the fittest, every dose the patient takes necessarily occupies the attention of the organs of elimination. Toxins and medicines alike pass out together. Then, if our remedy is an irritant, upon which side do we stand? An enemy under false colors? These organs will quickly give you the alarm if you are firing at your own men. Pills and bullets are blind, and therefore wound friend and foe alike. The coma vigil, wild delirium,

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thready pulse, revolting stomach, all point with unerring finger to the mistakes in doses and diet. When the poor, miserable patient has the disease and the doctor both to fight, he deserves promotion if he survives the desperate attempts of both to kill. You may think this a little harsh, but when you recall the lingering cases of typhoid fever on your list, you may well say that ninety per cent. could have been different. I do not mean those cases in which Bright's disease or some chronic trouble already has a foreclosed mortgage on the patient, but those cases that began with typhoid fever.

The course and duration of a case of typhoid fever depend upon the physiology and pathology of the patient, and our conduct.

We all have the title of doctor of medicine, but in typhoid fever we are not doctors but judges. We hold the same relation to the disease and patient as his honor does to defendant and plaintiff. We are not called upon to give medicine because we have that privilege, but to sit at the bedside and judge, as it were, the issues as they are presented; in fact, to keep out factions and party jealousies among the organs and to bring the case to trial between germs and patient. Gentlemen, this means more than using the thermometer, feeling the pulse, or looking at the tongue. It means more than using text-books as our compass. Each day of the disease is a day unto itself. The disease is divided into stages of weeks, but we must divide it into stages of days. Each day gives you light upon that day only.

One has wisely said, "The proper study of mankind is man." To be successful, then, "know your patient"; unless you do, he will not know himself long.

When called to a case of typhoid fever at any stage, open the journal and examine carefully the liabilities and assets. Like love, that levels all ranks and hides a multitude of faults, there is one word in our language that covers all knowledge, though it be always hid. This word is "why." It is the alpha and omega in all consultations. It is a question that I ask myself about every symptom. At every bedside I am always twins and we hold a consultation. Is the patient older than his age? If so, why? Is he anæmic or plethoric? If so, why?

Is his temperature too high? If so, why? Is his pulse too strong, too weak, or too quick? If so, why? Is he nervous, full of pains and aches? If so, why? Is his tongue foul, are his sweats acid, his bowels too active? If so, why? There is no necessity for foul tongues, delirium, acid sweats, pains, headaches, sick stomachs, insomnia, high temperature, and weak pulses in typhoid fever. If we will practice physiology instead of medicine, we will avoid these.

The sum total, then, gentlemen, is, when you get a typhoid-fever patient in bed, give him a rest; I mean, a rest from the crown of his head to the soles of his feet. There will be a drain on the system, a disturbance of the equilibrium between assimilation and waste. The patient lives on himself to a certain degree. Then it is that we must minimize waste in any organ. When one is financially embarrassed, he must cut off unnecessary expenses if he expects to be established. The same rule applies to us physically.

The patient's mind must not be upon his business. If he has been irregular in his habits, we must at once establish a regularity. In fact, we must as nearly as possible reestablish his organic harmony and let each organ do its work. I don't mean that it is possible to anoint a man with clay or by a simple touch of the hand work a miracle and give him a new set of organs; but I mean, if a man has been poisoning himself or has been irregular in habits, we can withdraw the poison or make regular his habits, and thus help the cause.

In seven years' experience with typhoid I have lost few patients. Four deaths occurred from hemorrhages caused by ignorant nurses meddling with the cases—either giving purgatives or bad feeding. The fifth case was complicated by inflammatory rheumatism. Have never had any bad results; patients always got well without after trouble, so common in fevers.

I have given you a few general principles preliminary to the treatment of a case of fever. I will now enter into the treatment in detail. When I say in detail, I do not mean the treatment of typhoid fever in general, but the treatment of the patient. To give the general outlines for treatment would contradict my statement that I would not give you text-book theories which are treatment in general for typhoid fever.

Let us divide our cases into two classes—those who were healthy prior to the acute disease, and those who have had chronic diseases for years. In the first class we are at an advantage, and in the second we are laboring under great difficulties, and it requires sound judgment to keep on the right side.

Case A is in the first class. He is a young man of twenty and a perfect type of physical manhood. He has been complaining for a week and has called at the doctor's office several times for medicine. Once or twice the doctor found him with a degree or two of fever. He was given calomel for biliousness and quinine for possible malaria, or something for the young man to take. He gradually grows worse, and after having a restless night with headache and general pains, he sends for the doctor. Right here, gentlemen, is a chance for brilliant success or a fatal and criminal mistake. He has a temperature, perhaps, of 103° F. He has had a hard chill. His pulse is rapid but regular and of good volume. Now, for your question why? The functions of the stomach are threefold—the Trinity, as it were. They are digestive, absorbing, and germicidal. To impair one necessarily impairs the other two. Here is the keynote to the whole matter—keep in harmony with the Trinity. To reject one part is to reject the others as well. The patient has taken medicine irritating to the stomach and has been eating indiscriminately since the first symptoms of his trouble, and the chill, high fever, and headaches tell us of the fact. Now, gentlemen, allow me to use here a theory for reference: "Give liquid nourishment and stimulants." Right here is where we are deceived—stimulants—a dangerous weapon, indeed! He is given another purgative, more quinine, and he is directed to take a glass of milk every three hours, and a tablespoonful of whiskey or brandy every four hours until you return. Have any of you ever been guilty of this mistake? Think of it! I repeat it: A "glass of milk every three hours, and a tablespoonful of whiskey every four hours until you return"!

"Well, you may ask, 'What of it?' I can show authority for such directions"! So can I show where the Jews crucified their Saviour, too. A stomach when in perfect health cannot digest food long oftener than three times a day. But when the healthy stomach of Case A takes typhoid fever, and, repeating

my words, it needs a rest for the long task it has before it, you cause it to work constantly by giving food every three hours. What does this do? It breaks the link in the Trinity by hindering digestion, and, of course, hinders secretion and the germicidal power of the stomach. This is kept up for a week or more until the patient begins to vomit. His temperature is running to 104° or 105° F. His expression is dull and he is delirious. His pulse is growing weaker, and you are increasing your stimulants. What is the matter, and what, in the name of Heaven, are you doing? Take an old expression: "When the cat's away, the mice will play." When digestive and germicidal functions are crippled, germs take charge of the glasses of milk and the patient poisons himself hourly. Each glass of milk gives impetus to the trouble. No wonder it takes him weeks and months to recover. The disease and the doctor make a combination disastrous to any patient, though he be made of steel. This is where the dull characteristic expression, the delirium, the tympanites, the gurgling in the right iliac fossa, the feeble pulse, the emanation, the aches and pains, the diarrhoea come from. The text-books tell you how to diagnose a case of fever from the above symptoms. Is it possible that we must get a patient into the above condition before we can safely say he has typhoid fever? I am proud to say you will find the above symptoms lacking in my cases. The bright face, clean tongue, smooth skin, regular bowels, no pain, no delirium, no vomiting, a pulse that is scarcely above normal, a low temperature, peaceful sleep at night, a general good feeling, all tell a tale that gives me a different picture from the one I have just given you.

Now, about the whiskey you have been giving. Here is another criminal mistake. Why? Because the pulse laboring under the poison from overfeeding is accelerated. You mistake this for an indication for stimulation. If any of you ride a bicycle, or ever walk up a hill, you know that the best way to reach the top with little exertion is to walk or ride as slowly as possible, and thus save your energy. But, upon the other hand, if you start from the bottom in a run, and increase as you go up the hill, you will find yourself exhausted and unable to go further. So it is with the heart in disease. It needs rest

instead of stimulation to over-exertion. This causes heart failure and cannot but result disastrously. Let the heart alone. It knows its own business better than we do. Never, never, under any circumstances try to stimulate a weak heart muscle. It causes only exhaustion. I have told you what you ought not to do, so I will now give you my treatment of case A.

The first thing I never give is a purgative. Why? Because there already exists an inflammation in the bowel and it is unsurgical to cause severe muscular action over any inflamed area. Calomel in this case, then, is unsurgical, if you please. Some may argue that bile is an antiseptic. Then, if it is, the jaundiced only would have typhoid fever. Bile can do nothing with the typhoid-fever bacilli that are already in Peyer's glands. These are the ones that concern us.

If the patient is nauseated, I withdraw all food for twelve or twenty-four hours. Then I feed him three times a day; not every three hours. If he is not hungry at the meal time, I direct him to wait till he has an appetite. This waiting will not occur very often. His food consists of beef tea, beefsteak scraped into a pulp or run twice through a meat chopper, crackers rolled fine, eggs either raw or cooked lightly, and soups in small quantities. The food is in small quantities and highly nutritious. Solid food I know is against the advice of every authority. But let us look into digestion. Does beefsteak pass out of the stomach a solid or liquid? Do eggs, milk, crackers pass out as solids or liquids? Milk, the great fever killer, and the only reliable food some advise, always becomes a solid after it enters the stomach. So where is the difference? Solid food is not dangerous if it is taken in a condition and in a quantity that the stomach will digest. Never allow your patient to eat anything that he is required to masticate, but always prepare meat and other food, so that it needs only to be mixed with the saliva. Then his stomach will digest perfectly the food and the patient will be nourished and the germs starved, and his stomach will get the needed rest, and then there will be no self-poisoning from decomposed food that passes out of his stomach every three hours—food rotten enough to kill a well man.

Orange or lemon juice at intervals will be grateful to the

patient, and will do no harm. If there is no fermentation, the patient may take gelatin with rich cream over it. This gelatin and cream should be given in small quantities and on an empty stomach. Let all food be highly nutritious and small in bulk and easily digested—food that will leave the stomach in proper time and will not over-stimulate gastric secretions.

When the temperature runs over 101° F., I use as an antipyretic antifebrin. I usually give three doses during the day and one at night if the patient is at all restless. As a rule, I give medicine for its effect on the patient and not on his friends. I do not give medicine until I see a dose is indicated. Some may want medicine because they are sick; and if they persist in it, I quote one of Solomon's proverbs to them. Solomon was a very good physician. The one to which I refer is: "He who meddleth with strife is like one that taketh a dog by the ears." The entire organism has all it can attend to without our throwing any straws in the way by giving useless remedies. If the patient is a little restless for a few nights, I give him a sedative. I like bromidia very well because it has no bad after-effects. As a rule, patients will rest well if the nurse will not disturb them every two or three hours during the night to give nourishment and stimulants. This is a point that I wish to emphasize: avoid as much as possible disturbing a patient during the night. Rest is essential to health, and, of course, a patient needs it. Let him sleep until he awakes of his own accord. If the tongue is dry, I give for a day or two small doses of turpentine in capsules, or else I give a small dose of creosote or carbolic acid and tincture of iodine. I have the patient's mouth cleansed three or four times a day, and direct him to chew tolu an hour or two every day until the tongue becomes moist. I direct him to take as much water as his stomach can conveniently absorb.

As I pay special attention to the stomach, I do not forget the rectum and colon. These require as much attention as the stomach. I have the colon irrigated two or three times a day with warm sterile water, and if there has been a diarrhoea I use boric acid or a very weak solution of permanganate of potassium. These injections free the lower bowel and prevent any putrefaction or absorption, and thus relieve the system of what gives

us that dull, characteristic expression, the foul tongue and sordes upon the teeth, the low muttering delirium that our text-books call the typhoid state. This is a phrase that I am sorry has ever found its way into our vocabulary. I hope it will soon become obsolete.

I have the patient's entire body sponged in warm water once or twice a day. If a bath tub is available, I have the patient immersed in the warm water, and the bath is kept up for from ten to twenty minutes. The body is wiped dry and the patient returned to bed. A warm bath given at night produces sleep like a sedative. I never use cold water, for it is not grateful to the patient and causes shock that is unnecessary. I find the warm water has sufficient antipyretic effects. It keeps the skin active. If water is not taken by the stomach in sufficient quantities, I give an injection of about one pint of decinormal saline solution into the colon after it has been irrigated.

I pass to Case B. This class of cases gives us much trouble, because we begin the struggle at a disadvantage, but we have an opportunity to use the same care and judgment as in Case A. Most chronic diseases are in the lungs, kidneys, heart, or alimentary canal. Of these the diseases of the alimentary canal are the most difficult. I have had consumptives pass through typhoid fever as easily as a robust patient, but those unfortunate dyspeptics are a source of worry to the physician. We must watch digestion with special care. If there is myasthenia with fermentation, we must give a very small amount of food, easily digested and slow to ferment. The white of an egg suits this class of patients better than any food. The myasthenic stomach digests it better and it usually leaves the stomach empty in two hours, and this leaves about sixteen hours' rest for a stomach that does not know what rest means, and I assure you it will be glad that its owner has had typhoid fever. Do not give milk to a patient with weak digestive power. Antiferments may be given if necessary. Bismuth, turpentine, carbolic acid, or two or three grains of chloral act very well. The stomach tube is the best preventive that we possess.

If the stomach is irritable or there is hyperchlorhydria, give sedatives just before food is taken. A cup of hot water and a large dose of bismuth will usually prove efficient. These cases

improve as the food is decreased in quantity and changed in quality. I have found that irritable stomachs with hypersecretions are the result of too much food improperly masticated or cooked.

Complications must be watched for, and each met by proper remedies.

The colon is irrigated and the baths are used as detailed in Case A.

By promoting digestion and preventing indigestion, and keeping the alimentary tract from stomach to anus free from absorbable toxins, we will have no necessity for an average temperature of over 100-101° F., and a pulse 72 to 80 per minute. The sum total is: Favor digestion, prevent absorption of toxins, and promote thorough elimination of the toxins unavoidably absorbed.

MEDICAL STATISTICS OF THE SPANISH ARMY, 1896.

(Translated from *Revue du Cercle Militaire* of August 26, 1899.)

FROM a summary of the medical statistics of the Spanish army, for 1896, the following extracts are taken:

Cuban Army.—The mean effective strength of the Cuban expeditionary army, including volunteers, reached 200,000 in round numbers. The following was the distribution, by provinces, of sick and deaths:

	SICK.	DEATHS.
Havana,	95,611	3,898
Isle of Pinos,	542	22
Matanzas,	16,907	1,038
Pinar del Rio,	27,483	1,311
Puerto Principe,	14,796	580
Santa Clara,	30,198	1,730
Santiago de Cuba,	47,177	2,031
Total,	232,714	10,610

The 232,714 sick passed 3,680,245 days in the hospital: admissions were considerable in November and December,

and rather numerous in July, August, September and October. Deaths represented 53.05 per thousand of the effective strength; of the 10,610 deaths, only 1708 officers and men fell on the battle-field or succumbed to wounds received during the engagements of 1896.

Surgeons report that 4187 were wounded, as follows: 2923 by small-arms, of which 94 were by explosive bullets; 17 by artillery projectiles; 699 by cold steel; 88 by explosions prepared by the insurgents; 463 by weapons causing contusions and by burns of which the causes were difficult to determine.

Yellow fever caused 7309 deaths, and induced 23,580 admissions into the hospitals. The mortality, very light during March, April, February, May and January, when it did not reach 200 deaths per month, rose regularly in June, July and August, diminished in September, and reached the maximum, 1336 deaths, in November, to descend abruptly in December to 750 deaths.

The most numerous losses are attributed to marsh fevers, dysentery, typhoid fever and tuberculosis.

1935 soldiers had to be replaced and 3902 sent home, principally for general weakness, or anemia, produced by the climate.

Puerto Rico Army.—The mean effective strength of this army, in 1896, did not exceed 5069 officers and men, including 653 civil guards. Hospital admissions numbered 4642, or 815.15 per 1000 of the effective strength; there were 78 deaths, or 14.2 per 1000; 51 furloughed and 121 sent home. The 1895 practice of sending to Puerto Rico reinforcements who suffered greatly before becoming acclimated, was attended with very deplorable results.

Philippine Army.—The movements resulting from the insurrection which unexpectedly happened in the last half of 1896, prevented the colonial corps from furnishing strictly accurate figures in its reports. Still with some reservations, the medical inspector thinks much value can be attached to those which follow, and remarks that contrary to ideas hitherto entertained, the mortality of native soldiers has exceeded that of the Spanish contingent, the latter being no more acclimated than the 1895 Puerto Rico contingent.

The mean effective strength of the Philippine army in 1896, was 4107 Europeans and 16,551 natives. 3910 Europeans, or 952.03 per thousand were admitted into the hospital and 10785 natives, or 651.62 per thousand. But the Europeans lost by deaths but 52 men, while the natives lost 245, being 14.80 per thousand. One hundred and fourteen Europeans were sent home and 366 invalided, of whom but 30 were Europeans.

Concluding, the medical inspector remarks that the sanitary records of Cuba, Puerto Rico and the Philippines would have been more satisfactory, in spite of insurrections, if it had been possible to send to these colonies grown men, and not young men of 20 or 21 years, who from landing, were obliged simultaneously to become accustomed to a new climate and stand the fatigues of a campaign; he recommends the employment in future of old soldiers for these expeditions.

NOUVELLES DE L'ETRANGER.

(From *Revue du Cercle Militaire*.)

LE *nouvel explosif*.—S'il faut en croire l'*Army and Navy Gazette*, le nouvel explosif inventé dernièrement par un savant américain fait beaucoup de bruit aux États-Unis. On dit que cet explosif, tout en étant plus efficace que la dynamite, serait moins dangereux à manier que tous les explosifs brisants actuellement connus. On ajoute qu'il ne produit pas la moindre fumée et qu'il ne contient ni nitro glycérine ni nitro cellulose. Les Américains font actuellement des expériences très approfondies pour en reconnaître les avantages pratiques.

Moyen d'apercevoir les troubles atmosphériques de la poudre sans fumée.—D'après le *New York Herald*, le département de la guerre a décidé que les officiers faisant partie du corps opérant aux Philippines seront pourvus de jumelles à verres violets, afin de pouvoir apercevoir, même aux grandes distances, les troubles atmosphériques causés par la poudre sans fumée. Cette décision a été prise à la suite d'observations faites par la colonel Smart, qui aurait remarqué qu'il est possible, en regardant à travers des verres violets, de distinguer l'endroit d'où est tiré un coup de

feu avec un fusil brûlant des cartouches chargées en poudre sans fumée.

Une marche-manœuvre de 88 kilomètres en trente-cinq heures vient, dit l'*Allgemeine Militär-Zeitung*, d'être exécutée ces jours derniers par le 1^{er} bataillon du régiment de fusiliers comte Moltke en garnison à Glatz.

La bataillon, dont l'objectif était le Schneeberg de Glatz est parti le 31 juillet à 5 heures du matin en tenue de campagne. Après avoir traversé Habelschwerdt, il a pris la formation de combat à l'entrée de la vallée de Wölfel et a mangé la soupe à 11 heures au moulin d'Urnitz. Il avait à ce moment franchi 31 kilomètres. A 1 heure après-midi les hommes ont commencé l'ascension de la montagne et sont arrivés vers 3 heures 1/2 à la vacherie du grand Schneeberg, où ils ont déposé les sacs pour continuer à monter jusqu'à l'endroit où a été inauguré, il y a quelques semaines, la Tour Guillaume. Le bataillon commença ensuite la descente, et après une demi-heure de repos à la vacherie, les 1^{re} et 2^e compagnies se dirigèrent sur Klessengrund, et les 3^e et 4^e sur Wölfelsgrund, où elles prirent respectivement leurs cantonnements vers 6 heures du soir. Le 1^{er} août au matin les deux demi-bataillons se dirigèrent chacun de leur côté, sur le village d'Eisersdorf, au Sud duquel ils se livrèrent un combat de courte durée. Après un repas pris sur terrain, le bataillon se mit en marche pour regagner sa garnison où il arriva à 4 heures après midi. L'*Allgemeine Militär-Zeitung* ajoute que les chasseurs avaient une très bonne allure en rentrant à la caserne, bien qu'ayant fait, outre la manœuvre, 88 kilomètres en trente-cinq heures, en partie en montagne. Aucun homme ne serait resté en arrière.

Military Notes.

DEADLY GERMAN WEAPON WHICH CAVALRY MAY ADOPT.—
TRIAL, MADE BY DIRECTIONS FROM THE GOVERNMENT.

TO make a scientific demonstration of the accuracy and effectiveness of the marvellous new fire-arm, the Mauser automatic pistol, was the object of about twenty surgeons and military men who went out to the Waldo racecourse south of Kansas City yesterday.

The test was conducted by Dr. J. D. Griffith, who has made a special study of fire-arms and explosives, and is looked upon as one of the best posted men in the United States on that subject. It was made under instructions from the Government, and Dr. Griffith will prepare a detailed report to submit to the War Department. He will also make the test the subject of a special discussion before the Association of Military Surgeons, which meets in Kansas City, September 27 to 29.

The Mauser automatic pistol is really a combination pistol and rifle, and can be used detached from the stock as an ordinary revolver, or it can be mounted to serve the purpose of a carbine. It is easily the most wonderful piece of ordnance ever actually adopted for the use of soldiers, and the results of nearly 500 shots from the one used in the test yesterday, fired under ranges from 50 to 500 yards in all of the usual positions, was a revelation to the experienced military men who were there.

ONLY THREE OF THE PISTOLS HERE.

There are only three of these pistols in the United States, it being a German production in use in the German cavalry. The one used yesterday was smuggled into America at great hazard, and there is no doubt that if the German who was instrumental in furnishing it to this country were found out there would be a German Dreyfus case. The Kaiser's government has jealously guarded the secret of its construction, and many other countries have tried in vain to secure one as a sample. It is said that the

cavalry of Germany has been drilled with the Mauser pistol until it has become the most effective military organization in the world.

Detached from the stock the pistol resembles in a general way a 44-calibre Colt's revolver except that, although it looks more cumbersome, it is as a matter of fact much lighter and of finer construction. By a most ingenious device the pistol fits into a wooden scabbard that, by being fastened to the breech, becomes the stock, thus transforming the pistol into a rifle. Altogether the breech and pistol do not weigh more than five pounds, and the fire-arm can be used with one hand either as a pistol or rifle.

An accompanying picture represents it mounted as a rifle. The scabbard or shoulder stock is connected at the narrow point at the base of the pistol grip, and so simple is the connecting of the two parts that the piece can be mounted as quickly as a man can put his two hands together.

The pistol is of the finest steel, assembled with wonderful ingenuity, and so careful has the inventor been to make it free from parts that might get out of order that he has built it without a single screw or bolt except in the handle, where he has made use of one screw.

The wider part around the trigger is the magazine. It shoots ten shots without reloading. The pistol is built so that the recoil of the first shot ejects the cartridge, sets the hammer and pushes another cartridge into position. A pressure on the trigger is necessary for each shot, but this pressure is no greater than that of an ordinary revolver and not so great as a self-cocking revolver. So rapidly does the recoil do its work that the pistol is instantly ready for use after a shot has been fired. Major W. T. Stark on a trial yesterday fired the ten shots from the piece in $3\frac{1}{2}$ seconds.

A VICIOUS LITTLE CARTRIDGE.

Thirty calibre bullets are used and these are of lead faced with copper and nickel plated. Each bullet weighs eighty-five grains and the cartridge is very small. The explosive has a nitro-glycerine base and a nitro primer. It is absolutely smokeless and the report is sharp and loud, with a ringing detonation that resembles the report of the Krag-Jorgensen.

In the loading device the ingenuity of the inventor has overcome a very difficult proposition. The cartridges come in paper boxes, and ten of the cartridges are strung upon a tin base, which holds them in place by the cartridge flanges. When loading the pistol the operator takes a package of ten cartridges and by a deft movement inserts one end of the tin base in the magazine of the pistol. He then slips the entire ten cartridges into the piece with a single movement of the hand. It takes less than ten seconds to load the pistol.

Those who were invited to witness yesterday's test and who took part in them were:

Dr. J. D. Griffith, president of the Association of Military Surgeons of America and medical director of the National Guard of Missouri; Hugh Ward, General Milton Moore, Chief of Police John Hayes, Dr. E. O. Coffin, Herman Brumback, Major W. T. Stark, William Sloan, Dr. E. H. Thrailkill, Dr. Charles G. Allen, Dr. H. H. Heylmun, Dr. T. B. Thrush, Major N. O. Harrelson, chief surgeon of the Fifth Missouri Volunteers; Robert Keith, Jr., Herbert Spencer, Albert McKeown and other medical students, who assisted in the post-mortem demonstrations.

HUMAN BODIES USED AS TARGETS.

The party left the Rialto building early in the morning in a tally-ho, and when it arrived at the park a cadaver was found in position on a framework, and the shooting range marked off by small flags into 100-yard distances up to 500 yards.

The cadaver was used in order to demonstrate the effect of the Mauser bullets on the human body. It was arranged to represent as nearly as possible the position of a man standing erect.

Dr. Stark was the first marksman and he stood at the fifty yard line and fired nine bullets, all of which took effect in vital parts, except one that hit the left elbow. This wound was characteristic of many that followed where a bone was encountered. At the points of entrance and exit the wound was so slight as to be scarcely perceptible, and was what is called diamond shaped. The wound was about the size of a small lead pencil and there was no external laceration whatever. Inside, however, the character of the wound was different. When

the bullet struck the bone it fractured it into at least a dozen pieces, but the humerus was not completely broken off. The fractures were all lateral and not transverse, as is common with the old style bullets. In his examination of this wound Dr. Griffith said: "That is the most humane bullet I have ever seen."

At 100 yards Police Commissioner Hugh Ward hit the target five times out of ten shots. These wounds were in vital places and were not examined yesterday. The marksmen then moved out to the 200-yard flag and Dr. Stark scored three hits out of ten shots, using an arm rest.

Chief Hayes then took the pistol, which was used altogether as a rifle with the stock attached, and shot ten times standing without a rest and his score was three hits, two of which were in vital parts.

Dr. Thrailkill and Dr. Thrush shot ten times each, with three hits between them, one of them being in a vital part. Dr. Brumback scored one vital hit.

At the 300 yards flag Dr. Stark and Dr. Allen shot thirty times between them, scoring three vital hits. They both fired sitting down with an elbow rest.

The sights were set for 300 yards when the firing party moved up to the 400-yard flag. It was one of the conditions of the tests that the sights be thoroughly tried. At this distance the target could not be seen in detail, yet Dr. Stark, who proved a wonderful shot, scored three vital hits out of ten shots. Chief Hayes got one. Both stood with elbow rests. At the same distance the sights were moved up to 400 yards, but no hits were made, the bullets going too low and cutting the grass twenty feet in front of the target.

The 500-yard flag was on the roof of a house and commanded a good view of the cadaver, although only a pale blotch against a dull background could be seen. The sights of the pistol were not designed for fine shooting, as the weapon is for cavalry uses exclusively, yet notwithstanding this, some good shots were made. It was noticed that the wounds made at this distance were of a somewhat different character from those of a closer range.

PROPELLED WITH TERRIFIC FORCE.

The carrying power of the new weapon is simply wonderful and compares well with the Mauser, Lee or Krag-Jorgensen rifle. One of the shots from the 500-yard mark penetrated ten inches of pine wood, after going through the body of the cadaver, and it was lost in the ground. It was a noticeable fact that most of the shots from all ranges went clean through the body of the cadaver.

The bullet of the pistol is covered with copper, with a nickel finish, in order that it may spread as little as possible when it enters the body. This is a humanitarian principle upon which all the Mauser projectiles are constructed. It will be remembered that during our war with Spain the Spanish soldiers were found cutting the ends off these bullets, which caused them to "mushroom" and consequently inflict horrible wounds. These are similar to the "dumdum" bullets that were used with such disastrous effect against the English in Africa.

It was noon when the first series of tests was completed and Dr. Griffith led the party to one side of the park, where a bountiful picnic luncheon was served. Here the official photographer who had taken pictures of all the wounds on the cadaver turned his camera upon the living, who were eagerly devouring the fried chicken and sandwiches, and a group picture of all those present at the tests was the result.

In the afternoon more long range firing was resumed. About 3 o'clock a post-mortem was held on the cadaver to determine and record the wounds inflicted.

In most of the wounds the points of entrance and exit were small and diamond shaped with no external laceration on either side. The interior, however, was almost without exception badly lacerated. The tests proved without doubt that the bullets were more humane than the old style which lacerated the entire wound.

Dr. Griffith expressed himself as well pleased with the experiments and he said that they demonstrated fully the marvelous character of the German weapon. It is possible that the Mauser pistol will be adopted in the United States army although it is the most expensive individual fire-arm made. Germany has a contract for the pistols at \$32.84 each and each

cartridge costs 4 cents. It is said the Mauser rifle costs \$21 and the Krag-Jorgensen about the same, while the Lee is several dollars higher.

General Milton Moore said at the close of the tests that they had added much of great value to the data on fire-arms for the army. The chief value of the Mauser pistol lies in its lightness, the ease with which it can be carried, its smokeless feature, the rapidity of operation and its great carrying power.—*Kansas City (Sunday) Journal*.

AN ARMY SANATORIUM.

Orders have recently been issued authorizing Surgeon-General Sternberg to establish a sanatorium for the treatment of officers and enlisted men of the army suffering from pulmonary tuberculosis, at Fort Bayard, New Mexico. Hereafter transfers of enlisted men suffering from this disease may be made to this hospital upon the recommendation of medical officers of the army. The Surgeon-General is also authorized to provide for the care and treatment of discharged soldiers entitled to the benefits of the United States Soldiers' Home, Washington, D. C., who may be sent to the sanatorium by the board of commissioners of the home.

THE COLT AUTOMATIC GUN.

The Duke of Cambridge, who was accompanied by Colonel FitzGeorge, witnessed on Thursday the 20th inst. at the Runnymede Rifle Ranges, Staines, the first public demonstration in this country of the Colt automatic machine gun, which was used with great success in Cuba and Manila by the United States Army and Navy. There was a large attendance, including a numerous contingent of distinguished naval and military officers, and several members of Parliament. Among those present were the Earl of Crawford, Earl Cairns, Lord Lawrence, Field-Marshal Sir Donald Stewart; Admirals Keppel, Hoskins, and FitzGeorge; Generals Sir Martin Dillon, Sir W. Olpherts, V.C., Sir Seymour Blane, Sir Andrew Clarke, and Sir J. Gordon.

The Colt gun, the patent of the Colt Patent Fire-Arms Manufacturing Co., of Hartford, Conn., U. S. A., is the result of ex-

haustive experiments and the perfecting of a method whereby the powder gases are utilized to work automatically the firing, ejecting and reloading mechanism. The gun can be constructed for the use of any kind of rifle ammunition; is particularly adapted to the needs of the army or navy, and can be fitted to the various mounts suitable for the service. The light weight of the gun and its compact size make it especially suitable (when mounted on tripod) for use by cavalry or infantry, where the matter of transportation is always an important factor, especially in rough countries where carrying must be done on pack saddles. The gun can be fitted to the different kinds of carriages, including those for the service of cavalry and infantry; also on a parapet mount for fortification purposes, and on cone, bulwark and landing carriages specially adapted for naval purposes. This gun weighs about forty pounds, and with its simplicity, compactness and fine adjustment, can be easily handled by one man, and every shot used with accuracy. In a recent test in America to demonstrate the durability of its working parts, rapidity of action and non-liability of fouling, some 8000 rounds were fired, the guns going through this whole test without a hitch, or showing any wear or weakness. At 200 yards, for accuracy, 100 consecutive hits were made in sixteen seconds, demonstrating that the gun, besides being durable and of rapid action, is also most accurate.

The weapon itself consists of one barrel attached to a breech casing, in which the mechanism for charging, firing and ejecting is contained. The cartridges are automatically fed to the gun by means of belts which are coiled in boxes readily attached to the breech casing, and these boxes moving with the latter, the supply of cartridges is not disturbed by the vertical or horizontal movement of the gun. The boxes contain one hundred, two hundred and fifty or five hundred cartridges each, and are so constructed that they can be quickly attached or removed. The automatic action of the gun is effected by means of the pressure of the powder gases in the barrel, after the projectile has received its maximum velocity, without decreasing its range or penetration. This object is attained by a small radial vent in the barrel somewhat in rear of the muzzle, opening downward from the bore. This vent is closed by a piston

which fits in the gas cylinder surrounding the outer edge of the vent. The piston is pivoted to the gas lever so that it adjusts itself to the gas cylinder, while the lever swings in a vertical plane. The barrel is strong enough to withstand the heaviest charges of nitro powder and the accuracy is not disturbed by the vibration incident to rapid firing; nor does it heat as rapidly as the light barrels of other systems, therefore the troublesome water jacket for cooling is not required.

The *Army and Navy Journal* (New York), in writing of the tests made with the gun early this year, said: One man can carry it on his shoulder and operate it, the only operation required outside of firing being the renewal of the cartridge belt, which can be done with little loss of time, and a second man, who is required to carry the tripod, can renew the belt. Not being disturbed in its aim by the motion of a crank, the fire of the automatic gun is so perfect that one can almost write his name on the target with the bullets from it. The board did not accept the conclusions of the critics who assert that the Colt gun has not been developed sufficiently to put into active service; that it is liable to break down at the slightest provocation, etc. They report that in all the firings of the Colt automatic gun during the recent competitive test there was nothing to show that it would not stand indefinitely the hardest kind of usage. In the findings of the board which conducted the competition it is stated that the automatic system had reached a stage of development where it could be considered durable, safe and efficient. For these reasons it recommended the adoption of the Colt system.

In the demonstration of the gun given at Runnymede on the 20th inst., three guns were shown in action, two being of 7mm. calibre and one of .303 in. In the former rifleite was used, in the latter Government cordite cartridges Mark II. The objective consisted of eight first-class targets, each measuring 12 ft. by 6 ft., giving a total surface of 96 ft. by 6 ft. Volleys were fired at twelve, ten, eight and 500 yards, but as all the guns at each range were directed against the same target, it was impossible to judge of the shooting at the different distances. The general result was that of 2250 rounds fired 1220 were reported to have hit the target, a certain number of bullet-

marks being noticeable both at the extreme top and bottom. The vertical spreading is stated to amount to about 7 ft. at 1200 yards. The tests appeared quite satisfactory to the experts who witnessed them.—*United Service Gazette*.

THE OLD LONG BRIDGE.

The "Long Bridge" across the Potomac at Washington, D. C., is soon to be torn down to give place to a modern steel structure to be erected by the Pennsylvania Railroad. As a historical structure, this bridge is perhaps one of the best known in this country. During the Civil War it was considered the connecting link between the North and the South, and was crossed by thousands of troops. The bridge was built in 1833 and has been many times repaired.

THE PROBLEM OF THE TROPICS.

If we are to "take up the white man's burden" with any degree of success, our soldiers and emigrants from this country to tropical regions must first learn how to live in health under their new conditions. American medical men, too, should seize every opportunity to become versed in the etiology, diagnosis, and treatment of the tropical diseases. The question of the ability of the white man to acclimatize himself in the tropics is one that has been fully discussed in medical journals in all parts of the world within the past few years. Opinions differ widely on the subject. Pessimists say that it is impossible. For example, Mr. Benjamin Kidd, who is regarded by some as an authority on matters connected with the tropics, speaks as follows: "The attempt to acclimatize the white man in the tropics must be recognized to be a blunder of the first magnitude. All experiments based upon the idea are mere idle and empty enterprises foredoomed to failure. Excepting only the deportation of the African races under the institution of slavery, probably no other idea which has held the mind of our civilization during the last three hundred years has led to so much physical or moral suffering, and has strewn the world with the wreck of so many gigantic enterprises." However, Mr. Kidd expresses the opinion only of the minority, and such authorities as Manson, Sambon, and Cantlie hold that under cer-

tain conditions the white race is eminently fitted to cope with the dangers and difficulties of tropical life. The last issue of the *British Quarterly Review* contains an article founded upon the recent writings of some experts best qualified to speak judicially on the subject, and it is to be remarked that they, one and all, give views diametrically opposed to those of Mr. Kidd and the pessimists. Of course there is no evading the fact that in bygone days the mortality was fearful, but that it is not so now, when ordinary care is exercised, is easy to demonstrate. The *British Quarterly* says: "It must be borne in mind that the conditions of civilization in former years have greatly changed. Improved sanitation has reduced mortality to an enormous extent. In India the annual mortality of European troops prior to 1859 stood at 69 per 1000, now it has fallen as low as 12 per 1000. Colonies which were once called the European's grave, such as the West Indies, Hong Kong, and Algeria, are now recommended as health resorts. The real obstacles to the colonization of tropical lands are not temperature and moisture, but living organisms. Aboriginal man, wild animals, poisonous snakes may be serious obstacles to a foreign invasion, and many an attempt at conquest has been frustrated by such opponents; but the most fearful foes are the minute pathogenic organisms, or, in other words, the diseases peculiar to each region. These are sometimes amazingly fatal. These organisms have their especial geographical distribution, just like other animals and plants which do not become parasites of man. Some diseases like malaria and dysentery have a very wide distribution; others, like endemic hæmaturia, sleeping-sickness, and verruga, have very narrow limits; others again, like cholera and yellow fever, have restricted endemic areas, but under favorable conditions may become widely diffused in great epidemics. They are all intimately associated with other forms of life, and their limitation and diffusion are therefore dependent on the limitation and diffusion of other plants and other animals." If we are to accept Manson's theory in regard to the connection between malaria and a certain species of mosquitos, then the distribution and prevalence of malaria are due to the distribution of these mosquitos; and the dissemination of plague is probably owing to its prevalence among, and conveyance to

man by rats. To revert, however, to the question of the white man's ability to live in health in tropical lands, it must be said that a certain period of time is required for a newcomer to adapt himself to climate and environment and thus to acquire a degree of immunity. Again by some it is urged that if a white person wishes to retain his good health in the tropics it is absolutely essential that the strictest attention be paid to diet and clothing. On this point the *British Quarterly* has this to say: "The general opinion is that a vegetarian diet is better suited to a tropical climate, and that the use of alcohol is to be entirely prohibited. We cannot agree altogether with these statements. The eminently carnivorous Anglo-Saxon would be very unwise if he radically modified his diet on first landing in a tropical colony, and alcohol is not more deadly in the tropics than in any other climate."

Perhaps this expression of opinion will not meet with universal approval. Although it might be unwise for a European to alter the nature of his food at once, still there can be no doubt that less meat is required in a hot than in a temperate or cold climate, and it is just as certain that the less spirits consumed by the Caucasian in the tropics the better it will be for his health. The marvellous decrease in mortality among Europeans resident in tropical lands has been almost wholly effected by improved sanitation, and this fact goes to show that the diseases of the tropics can be as successfully fought as those of the temperate zone. What is now required is a more intelligent method of probing the secret of these diseases, and a more accurate understanding of the means by which they are conveyed to man. As we pointed out in the *Medical Record* some years ago, it would be well—in view of the work to be done in the West Indies and the Philippines—if a number of schools for the teaching and investigation of tropical diseases were established in this country.—*Medical Record*.



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Reviews and Exchanges.

Did the National Guard Fail?

(From the Northwestern Guardsman.)

IN a consideration of the question, "Did the National Guard Fail?" in the war with Spain, in the JOURNAL OF THE MILITARY SERVICE INSTITUTION, Capt. Harry F. Davis, of the National Guard of Pennsylvania, comes to the conclusion that it is not the National Guard that has failed, but it is the system which relieves the general government of all responsibility as to its condition that has failed. It does not seem to him that it could have been the idea of the framers of the Constitution that the general government was to have supervision over the militia only in time of war. The Constitution literally translated might give this impression, but men of the military experience of George Washington would hardly have conceived the idea of numerous independent armies congregated together without any head.

The State may retain certain powers and prerogatives, according to Captain Davis, but there must be one head and one system—a system that will include every State in the Union; but unless the general government is given full power to use these troops in time of emergency, and unless the Adjutant-General's office at Washington contains inspection reports made by Regular army officers, and is fully informed as to the condition of every regiment, as to its officers, men, condition and equipment, the Guard will never be what it should be—a national reserve.

"With our superb Regular army raised to 75,000 men," says the writer, "our National Guard increased to 225,000, and given national recognition, we would have a first and second line, behind which the people, who will always constitute the great reserve, could form their lines in time of national emergency."

There is a certain element urging an improvement in the National Guard on the ground that the militia system is the only one that can keep a reserve of trained soldiers behind the Regular army of the United States. It is argued that the subject is one which may be properly discussed during the next few months in anticipation of what Congress must do toward reorganizing the National Guard of this country. There is no system which requires readjustment more urgently than the militia of the United States, as it is contended, and it must be placed on a footing to make it serviceable to this country in time of war. It is further set forth that if the conflict with Spain demonstrated anything, it showed the crippled state of our militia system. The National Guard organizations were irregularly, where they were not inadequately, equipped. There was a lack of method and formation which added to the perplexities and difficulties of incorporating the citizen soldiery into Federal service, and it is held that it is well to call attention to these defects thus early that some opportunity may be given to the consideration by Congress next winter of this important problem.

"The National Guard must be placed on a basis which will make it of value to the country," says the writer. "It has been, to tell the truth, little more than a spectacular organization, given over to street parades and hot weather picnics in the guise of summer encampments. Its work has been, for the most part, insignificant and without value to itself, the State or country. The desired end can be accomplished, it seems to us, without any increase in the national allotment to the militia organizations. The issue of equipment and ordnance is a fairly liberal one, considering the return made by the State troops. It is mainly a matter of organization to put the militia in a condition of practical utility. The conferences of the National Guard officials held on two occasions in Florida have produced but few results, but the Tampa meetings have been steps in the right direction and we may expect that, after the demonstration of last year, there will be fewer obstacles to overcome in putting this State troops on an efficient footing, making the organization one great army of citizen soldiers instead of as many and varied armies as there are organizations."

Obituary.

The Editor is pained to announce the death of the following members of the Military Service Institution since the last issue of the JOURNAL.

First Lieut. Alfred W. Drew,

12TH U. S. INFANTRY.

Lieut. Drew was instantly killed August 19, 1899, in an attack on the insurgents, in the vicinity of Angeles, Philippine Islands. He was a native of Texas, and was graduated from the Military Academy in 1891. During the war with Spain he was major of the Third Texas Infantry.

He accompanied Lieut. Cole, 6th U. S. Inf., who with eighty men attacked and routed one hundred of the enemy intrenched at Tibuan, Negros mountains. The enemy left in the intrenchments nineteen dead, six rifles, and all reserve ammunition. They were supposed to be armed Tagalos, who had, a few days previously, crossed from Panay in small boats.

Captain James E. Eastman,

2D U. S. ARTILLERY.

Captain Eastman died on August 28, 1899, at Chase's Lake, N. Y. He was born in Massachusetts in 1841, graduated at the Military Academy in June, 1866, and was appointed 2d Lieut., 2d U. S. Artillery same day; he was promoted 1st Lieut., May 6, 1869, and Captain March 8, 1894; he was a graduate of the Artillery School 1878-1892, served at various posts, and during the war with Spain he was ill in a hospital, and was on sick leave until his death.

Captain Bogardus Eldridge,

14TH U. S. INFANTRY.

Captain Eldridge was mortally wounded and died after the battle October 1st, 1899, in which Captain Poore, 6th U. S. Infantry, attacked the intrenched robber band of Western Negros, west of Bacoor

and Imus, Philippine Islands. He was appointed 2d Lieut. 10th U. S. Inf., from civil life, August 31, 1876, from Massachusetts; promoted 1st Lieut. May 21, 1883; and Captain 14th Inf. September 7, 1897. He served in Alaska from early in 1898, until the spring of 1899, and went to Manila with his company in June last. He leaves a wife and three children.

Captain Marion B. Saffold,

13TH INFANTRY.

Captain Saffold was killed in an engagement with the insurgent Filipinos, near San Francisco de Malaban, Philippine Islands, October 7, 1899. He was a native of Alabama, and graduated from the Military Academy June 13, 1879, and assigned to the 13th U. S. Infantry, in which regiment he rose to the rank of Captain. Captain Saffold leaves no family.

First Lieut. Jno. D. Miley,

2D ARTILLERY (LIEUT. COL. & INSP. GEN. VOLS.)

Lieut.-Colonel Miley died of meningitis attendant on typhoid fever, at Manila, Philippine Islands, September 18, 1899. He was, at the time of his death, doing duty with Major-General Otis, who appointed him Collector of Customs. He graduated from the Military Academy in 1887, and was assigned to the artillery, being promoted First Lieutenant in 1894. At the breaking out of the Spanish War he was A. D. C. on the staff of General Shafter, where he was retained as Major and A. A. G. of Vols. during the entire Santiago campaign, rendering valuable services. He was one of the Commissioners to negotiate terms for the capitulation of Santiago, and later was sent into the interior with two troops of cavalry to receive the submission of the Spanish garrison. He published a work on the Cuban campaign. In September, 1898, he was appointed Lieutenant Colonel and Inspector General of Volunteers, and when the new volunteer army was organized he was assigned to duty with General Otis. Lieut.-Colonel Miley leaves a widow and four young children, the widow being the daughter of Colonel Mordecai, of the Ordnance Department.



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New Books.

The Officer's Field Note and Sketch Book and Reconnaissance Aide Memoire.—Lieut.-Col. Gunter has endeavored to combine in one handy light pocketbook a sort of *olla podrida* of military knowledge on various subjects, especially of essential details difficult to carry in the head, with a complete sketching apparatus for road and river, outpost and position sketching, field engineering, etc.

The forms are those used in the British army, but are really applicable to any army, being methodically and logically arranged. The hints on sketching on horseback and foot, on explosives, etc., will be useful to cavalry officers scouting anywhere, and there is ample room for the reconnoiterer to add notes of his own. The difficulty with officers generally is to find such notes when made. The arrangement and index made by Col. Gunter facilitates this.

There is a comparative table of British and foreign horse and field artillery, with details; some details of transport, ammunition, intrenching tools, etc., carried by some units in the field (without tents); comparative tables of English and foreign measures of length and of surface (square measure), of English and foreign weights, and of English and foreign measures of capacity.

At the back of this little book are blank sheets arranged for road sketching, and if Col. Gunter could but add at one corner a small but good compass the book would take the place of the cumbersome cavalry sketching case and field engineer book now furnished to the United States army.

*Tactics for Beginners.**—In this work, by Capt. C. M. De Gruyther, Instructor in Tactics at the Royal Military College, we find a distinctly useful groundwork for future study. The author assumes that the student is approaching the subject for the first time, and he tells him in clear and direct language, made clearer still by diagrams and colored plates, just those things that he ought to know. He begins, for example, with organization, and treats of the divisions of armies from companies to army corps; he shows the purpose of outposts and of advanced and rear guards; there is a chapter on the important duty of reconnaissance, and others on the three arms, cavalry, artillery and infantry, dealing with the characteristics and objects of each; and so by easy stages the student is led on to the considerations of conditions of actual warfare and the tactical value of various situations. In short, it is just what its title implies, a book of "Tactics for Beginners." It has already been approved as a text book for use at the Royal Military College, Camberley, and it may safely be commended to the careful notice of all young men in the military service.

Organization and Equipment Made Easy.†—Officers who are going up for the examination for promotion in subject "G" should find a considerable boon in "Organization and Equipment Made Easy." It has been compiled for the

* Published by Gale & Polden, Limited, of Wellington Works, Aldershot, England. Price 6s.

† Published by Gale & Polden, Limited, of Wellington Works, Aldershot, England. Price 4s. 6d., post free.

special purpose of saving officers the trouble of wading through the vast number of official books of regulations on the subject, and it contains a careful digest of the most salient features of our system of organization and equipment. When it is stated that the author is Capt. S. T. Banning it will be understood that the work has been well done. Capt. Banning, who has served as Deputy-Assistant Adjutant-General for Instruction in the Dublin District, is now Instructor in Military Administration at the Royal Military College, and is the author of examination papers in military law and military administration. With "Organization and Equipment Made Easy" in his hands, the officer should find no difficulty in passing the examination in this subject. A useful feature of the book is its appendix of papers that have actually been set for examination, with answers in full and references to the official books.

*Key to Military Sketching.**—The one thing that was wanting in Col. Hutchinson's excellent manual on military sketching has now been supplied by the "Key to Hutchinson's Military Sketching Made Easy." This key has been written for the publishers, at Col. Hutchinson's suggestion, by Capt. L. J. Shadwell, Deputy-Assistant Adjutant-General for Instruction at Kasauli, Punjab. The answers, which have been most carefully worked out, are freely illustrated by colored plates and diagrams. This key, which forms an indispensable companion to Col. Hutchinson's manual on military sketching, is published at 4s., post free.

Drill Book for the R. I. C.—Amongst the new books that Gale & Polden, Limited, have in the press is "Company Drill Made Easy" for the use of the Royal Irish Constabulary. Mr. C. H. Rafter, by whom it is being compiled, has just been appointed Chief Constable of Birmingham, and was formerly District Inspector of the Royal Irish Constabulary. Each movement of the recently revised drill will be given in detail, and there will be a hundred and sixty plates showing every conceivable movement that a company may assume. The book is to be published at 1s. 6d., post free.

The Hygiene of the Soldier in the Tropics,† by F. Burot, Médecin Principal de la Marine, Officier de la Légion d'Honneur, and M. A. Legrand, Médecin de 1^{re} class de la Marine, Chevalier de la Légion d'Honneur; translated by Capt. George W. Read, 9th U. S. Cavalry. In the preface of this work the translator states that "the importance of a knowledge of military hygiene on the part of officers in command of troops has long been recognized, and was painfully emphasized during the war with Spain by the heavy losses of many volunteer organizations that, remaining in home camps, did not see a hostile flag or hear a hostile shot. Not only is military hygiene a subject for serious consideration when our troops are stationed in a climate to which they are accustomed, but it becomes doubly so when they are called upon to serve in tropical regions whose climatic and hygienic conditions are new and strange, and where no enemy is so formidable as the endemic diseases. The climatic conditions of Cuba, Porto Rico and the Philippines are not unlike those of Madagascar, Tong-King and Martinique; and the observations of the medical officers of the French army in those regions are accordingly deserving of careful attention. It is reasonable to conclude that anything good or bad for a French soldier will be beneficial or injurious to an American soldier serving under like conditions."

* Published by Gale & Polden, Limited, of Wellington Works, Aldershot, England, 1899.

† *The Hygiene of the Soldier in the Tropics*. Published by the Hudson-Kimberly Publishing Company, Kansas City, Mo., 1899.

Acknowledgments.

Military.

Army and Navy Gazette, London, regular weekly issues for September and October, 1899.

Revue de L'Armée Belge.

United Service Magazine, London, for September and October, 1899.

Revue Militaire, Paris, for August and September, 1899.

Revista di Artiglieria e Genio, Rome, for August, 1899.

Revue d'Artillerie, Paris, for August and September, 1899.

Journal of the U. S. Cavalry Association, Fort Leavenworth, Kan., for September, 1899.

La Revue Technique, Paris, regular issues for August and September, 1899.

Internationale Revue, Dresden, for August and September, 1899.

Journal of the Royal United Service Institution, London, for September and October, 1899.

La Belgique Militaire, Brussels, regular issues for September and October, 1899.

Army and Naval Journal, New York, regular issues for September and October, 1899.

Journal of the United Service Institution for India, Simla, for July and August, 1899.

Revue du Cercle Militaire, Paris, regular issues for September and October, 1899.

United Service Gazette, London, regular issues for September and October, 1899.

Proceedings of the Royal Artillery Institution, Woolwich, for July and August, 1899.

Seventh Regiment Gazette, New York, for September, 1899.

Report of the Proceedings of the Society of the Army of the Tennessee (30th annual meeting), October 26-27, 1899. Cincinnati.

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The Nautical Gazette, New York, regular issues for September and October, 1899.

Revista Maritima, Rio de Janeiro, for July and August, 1899.

Miscellaneous.

The Century Illustrated Monthly Magazine, New York, for September and October, 1899.

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Appleton's Popular Science Monthly, New York, for September and October, 1899.

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Political Science Quarterly, Boston, for September, 1899.

American Journal of Mathematics, Baltimore, for October, 1899.

The Conservative Review, Washington City, for May, 1899.

Proceedings of the American Society of Civil Engineers, New York, for September, 1899.

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Scientific American, New York, regular issues for September and October 1899.

Medical Record, New York, regular issues for September and October, 1899.

Book Reviews, Macmillan & Co., New York, September, 1899.

Letter of Gen. Anthony Wayne of 1792, published by John W. Jordan, Philadelphia, Pa.

Slavery in the State of North Carolina, by John Spencer Bassett, published by the Johns Hopkins Press, Baltimore, 1899.

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Prize Essay—1899.

I.—The following Resolution of Council is published for the information of all concerned :

Resolved, That a Prize of a Gold Medal, together with \$100 and a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest, the subject to be selected by the Executive Council, and \$50 to the first honorably mentioned essay. The Prizes will be awarded under the following conditions :

1. Competition to be open to all persons eligible to membership.
2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before January 1, 1900*. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.
3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize*; and also in their order of merit those deserving of honorable mention.
4. In determining the essay worthy of the prize, the Board will be requested to consider its professional excellence, usefulness and valuable originality, as of the first importance, and its literary merit as of the second importance. Should members of the Board determine that no essay is worthy of the prize, they may designate one or more essays simply as of honorable mention; in either case, they will be requested to designate one essay as first honorable mention. Should the Board deem proper, it may recommend neither prize nor honorable mention. Should it be so desired, the recommendation of individual members will be considered as confidential by the Council.
5. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.
6. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held January 11, 1899, for the Prize Essay of 1899, is

"IN WHAT WAY CAN THE NATIONAL GUARD BE
MODIFIED SO AS TO MAKE IT AN EFFECTIVE
RESERVE TO THE REGULAR ARMY IN BOTH
WAR AND PEACE?"

III.—The gentlemen chosen by the Council to constitute the Board of Award for the year 1899 are :

HONORABLE THEODORE ROOSEVELT.
MAJOR GENERAL THOS. H. RUGER, U. S. A.
GENERAL JOSEPH W. PLUME of New Jersey.

GOVERNOR'S ISLAND, N. Y.
January, 1899.

WM. H. POWELL,
Secretary.



Additional Prize Essay.

The Secretary announces to the officers of the Army and Navy that LOUIS L. SEAMAN, M.D., LL.B. (late Major-Surgeon 1st U. S. Volunteer Engineers), has presented to the MILITARY SERVICE INSTITUTION OF THE UNITED STATES the sum of

ONE HUNDRED DOLLARS IN GOLD

(or a Medal of that value as the successful competitor might elect) for the best thesis on

THE IDEAL RATION FOR AN ARMY IN THE TROPICS.

The Executive Council has therefore decided that the competition is open to all officers of the Army and Navy (Volunteer or Regular); that three copies of the papers on the subject must be submitted to the Secretary by March 1, 1900; and that each thesis must be limited to 10,000 words, exclusive of statistics.

The Gentlemen chosen by the Council to constitute the Board of Award are:

COLONEL JOHN F. WESTON, Acting Commissary Gen'l, U.S.A.

LIEUT.-COL. CHAS. SMART, Deputy-Surgeon-General, U.S.A.

LIEUT.-COL. WM. E. DOUGHERTY, 7th U. S. Infantry.

WM. H. POWELL,
Colonel U. S. Army, Secretary.

GOVERNOR'S ISLAND, N. Y.,

July 22, 1899.

